

# RISK APPETITE AS CORE ELEMENT OF ERM: DEFINITION AND PROCESS

Andrea Cremonino\*

## Abstract

Risk appetite represents the decision of how much risk an organization is willing to assume consistently with its strategy. As a matter of fact each business strategy implies some amount of risk, in term of uncertainty with regard to the results will be achieved. Therefore risk appetite represents a fundamental element of ERM as it allows to frame the current risk profile.

The goal of this paper is to describe the general idea of risk appetite, its implementation framework, the process to set it within a bank with a strong focus on the interactions with other processes such as planning and control, performance evaluation and communication.

Even if risk appetite is a managerial tool, it should comply with regulatory requirements that are shortly described. To provide a full understanding of the risk appetite implementation, it is described how it could be implemented in two other industries: an oil company and a manufacturing one, for instance a car maker.

**Paper Type:** applied

**Key words:** risk appetite, ERM, planning, capital adequacy, performance evaluation, corporate governance, risk control, stress test, banking regulation

## Introduction

Risk cannot be eliminated from the corporate management because it stems from the unpredictability of the future outcome of the business decisions taken.

Consequently each company has set up, or it is supposed to set up, an Enterprise Risk Management (ERM) framework, i.e. a set of processes, methodologies and tools to ensure the risk is kept within acceptable levels. The recent crisis and the subsequent amount of company defaults, above all in the financial service industry, strengthened the importance of a proper and effective ERM.

The amount of acceptable risk should be set by the company and strongly depends on market conditions and above all by its risk tolerance.

Therefore risk appetite represents the core of ERM as it represents the yardstick to compare the current risk profile to.

Its full effectiveness is ensured if and only if it is embedded into the planning processes in order to have a “forward looking” ERM that is not a mere reporting or controlling framework.

Furthermore there is a growing trend of greater transparency to the markets about the current and target levels of risk as are represented in the risk appetite.

The goal of this paper is to describe the general idea of risk appetite, the process to set it within a bank and the interactions with other processes plus some example of application besides financial services.

The paper is organized as follows besides this foreword: a section to present the risk appetite framework and its components. Sections 2 and 3 respectively deal with the process and the governance while the following one regards the regulatory requirements. The example to other industry is described in section 5 while the last one summarizes some implementation pitfalls.

\* UniCredit Group , email: [andrea.cremonino@unicredit.eu](mailto:andrea.cremonino@unicredit.eu). The opinions expressed are those of the author and do not represent UniCredit view. Moreover presented concepts, methods and processes are not necessarily used by UniCredit or its affiliates. The author would like to thank Gabriele Stinco, Valeria De Mori, Maurizio Cravero, Alessandra Crimmi and Stefania Restivo.

## 1. Risk appetite framework

The risk appetite is a widely spread concept that needs to be structured in a dedicated framework for being implemented in a financial institution.

In a more detailed fashion, this framework is made by:

- the definition of risk appetite itself
- analysis of the relevant stakeholders and their expectations
- set of metrics
- purpose of the risk appetite and its usage
- the process to set risk appetite
- interactions with other bank processes, mainly the planning one
- governance

The first two topics are going to be addressed in the following subsections while the process and governance respectively in sections 2 and 3.

### 1.1. *Risk appetite definition*

Risk appetite represents the decision of how much risk an organization is willing to assume consistently with its strategy. As a matter of fact each business strategy implies some amount of risk, in term of uncertainty of the results that will be achieved.

Even if risk appetite is quite a widespread concept, the starting point of the risk appetite framework is the bank define risk appetite itself consistently with its culture and business model. This steps could sound trivial but it is needed to set a common ground to avoid any misunderstanding.

In this paper a broad definition is proposed as follows in order to be applied not only to banks or financial companies, but across all industries:

*“risk appetite is represented by the losses the company is willing and able to stand in order to reach the target results, where potential losses could be also represented by their drivers”.*

This definition could be reshaped in a more extensive way where risk appetite is expressed in term of maximum tolerated deviation of actual results from the target ones, having losses as extreme event.

It is appropriate to underline that the definition of risk appetite both in term of variables included as well as their amount depends on the bank strategy.

### 1.2. *Analysis of stakeholders*

The risk appetite must then be compared and set consistently with the stakeholders' expectations and requirements because it is a key component of the bank strategy. As a matter of fact all the stakeholders deem as a core issue the amount of risk held by a bank as well its evolution over time.

Here the following categories of stakeholders are considered:

- Debtholders
- Shareholders
- Regulators and Supervisors
- Governments

### **1.2.1. Debtholders**

The debtholders are those that provide the bank with its funding and are mainly interested in the solvency of the bank, i.e. the capacity to fully and timely keep all the obligations.

Even if all of them are bank' creditors, it is appropriate to part them in three groups:

- Depositors
- Interbanking (or wholesale) funding
- Bondholders

First of all as long as there is deposit guarantee scheme that refunds depositors in full, they could be uninterested in the bank management, including risk appetite.

As in the crisis many government provided blanket guarantees (e.g. Germany and Ireland), that exceeded the scheme underpinning the banking system, in this paper the focus is on the last two groups.

With this regard, the decision making process of the bondholders often relies materially on the evaluation of the issuer as expressed by its rating.

That means the primary focus of bondholder is on capital and liquidity strength as proxy of the bank solvability, as also represented by the rating agencies and their evaluation mechanisms.

### **1.2.2. Shareholders**

Shareholders profit is defined in a residual way, i.e. what is left from the bank income after all the other stakeholders have been paid back, that could also mean suffering a loss.

Therefore shareholders are interested mainly in the bank profitability and its variability over time because their decision making criteria is if the bank expected profit are adequate in comparison to the carried risks.

Consequently shareholders' concerns on the risk appetite is represented by the earning variability and its drivers.

### **1.2.3. Supervisors**

Regulators and supervisors play a key role in the financial markets and strongly impact the behavior of the different players.

With regard risk appetite several regulatory elements shape heavily the risk appetite in term of tools and amounts, for instance the Basel Accord where fact regulators set out the key metrics for assessing the banks' risks, capital and capital adequacy, namely the Risk Weighted Assets (RWA), Tier 1 and then their ratio defined as Tier 1 ratio.

Such influences have been strengthened in the forthcoming innovations to the regulatory framework, the so called Basel 3, where compulsory metrics are introduced not only with regard to capital adequacy but also concerning liquidity.

On the other hand it is fundamental how supervisors use such metrics in assessing the banks' soundness in their on and off site examinations. In a more detailed way supervisors pay carefully attention to the bank decision making process and what is the outcome in term of actual risk profile. That means supervisors are not only interested in the mere solvability, but also in the medium term business sustainability, therefore have a perspective that exceed the debtholders' one.

The banks' risk appetite frameworks then both heavily rely on regulatory metrics as well as embed supervisory expectations.

#### **1.2.4. Governments**

Further to the ongoing crisis, there is a new stakeholder, the governments, both in terms of lawmakers in shaping a new legislative landscape and as a special kind of shareholders due to rescue plans because they bailed financial institutions out of the crisis.

State interventions extended deposit guarantee schemes, supported banks via loans, both in form of actual lending or guarantees offered or security repurchase agreements, and lastly with huge recapitalizations.

Therefore governments are keen on avoiding banks from suffering large losses or being able to withstand them to avoid additional burden for the taxpayers.

Moreover governments often became banks' shareholders and thus they could impact substantially the risk appetite while in other cases they negotiated covenants and action plans to provide rescue packages, that could materially impact the risk appetite, for instance shutting down some business lines deemed too risky.

### **1.3. Set of metrics**

The aforementioned definition of risk appetite must be translated in a set of metrics in order to be embedded into the bank management.

In this section firstly the criteria underlying the choice of the metrics will be outlined in order to set out a general structure, then the main categories will be described and for each of them some examples will be provided.

The metrics belonging to the same category broadly address the same issue, but there is no unique nor obvious choice as it depends on what targets that the bank wants to achieve and the issues the bank would like to stress. As a matter of fact the metrics chosen steer the business activities and three paradigms will be presented in section 2.2

#### **1.3.1. Criteria for the metrics**

The full embedding of risk appetite into the bank processes requires translating the definition of risk appetite into a full set of metrics that should meet some broad criteria outlined below.

Firstly such metrics must be quantifiable in order to properly steer the business as qualitative statements could not provide an unambiguous target to be pursued.

Secondly the set of metrics should be able to provide a full picture of the bank risk profile. That could be achieved either by using synthetic metrics, i.e. metrics that represent the aggregation of risks or the main variables for the key risks. This potential choice will be described in Section 2.2

The third criterion is to pick up metrics that are able to represent completeness of the risk profile across the subsidiaries and/or business line.

Needless to say that should the risk profile not be adequately captured, the risk appetite could turn out to be useless or even misleading.

On the other hand the risk appetite is effective only if it cascaded down to all the subsidiaries and/or business lines, consequently the metrics should be able to be drilled down. Nevertheless in this process the metrics could be transformed to be applied to a more detailed level.

Lastly the metrics should be able to capture and represent completely the risk financing, i.e. the means to fund the losses that show up further to the risks.

In a more detailed way, the unexpected losses are faced by capital and therefore are represented in the capital adequacy domain.

Expected losses on the other hand are funded as cost because they represent a component of business running, for instance provisions on the performing portfolio that cannot be set aside in commercial lending.

### **1.3.2. Proposed set of metrics**

Besides being used in running the bank business, the picked up metrics should be able to address the concerns of all the relevant stakeholders, namely stockholders, bondholders, customers, regulators/supervisors and governments. In this paper we propose a risk appetite framework made by the following categories of metrics in order to provide a clear target setting to support business activities and meet the stakeholders' expectations:

- Capital adequacy
- Earning variability
- Liquidity
- Risk
- Business specific

The metrics above address the perspective of stakeholders as outlined in section 1.2 while provide a strong control of the business activities according to a framework flexible enough to be applied across all companies. For instance capital adequacy is the main concern of regulators/supervisors as well as a focus issue of rating agencies, while shareholders are concerned in earning variability, governments in both of them while everyone is interested in risk levels.

For each category some metrics are presented as well as their purposes and different usages.

It is appropriate to underline that in the proposed framework, risk appetite sets out the boundary conditions business activities should be run within. Therefore we do not include the variables that usually represent the targets of business activities such as revenues, profits, value creation, like Economic Value Added™ or RARORAC.

As a matter of fact risk appetite, as discussed in section 3, foresees the leadership, or at least the joint leadership of the Risk Management functions, that must not be involved in setting profitability targets.

### **1.3.3. Capital adequacy metrics**

Although capital adequacy is a clear concept, it could be described under different point of views that are represented as below where regulatory ruling play a lion share.

#### **Pillar 1**

Pillar 1 is a component of the Basel framework and represent the minimum capital requirements banks have to hold. Needless to say, the metrics envisaged in Pillar 1 must be included in risk appetite framework to avoid the bank not be compliant with the compulsory regulatory regime.

In a more detailed way the metrics are the following:

- *Tier 1 Ratio*, defined as the ratio of Tier 1 to Risk Weighted Assets (RWA), where the former represent respectively the high quality capital and the standard measure of risks<sup>1</sup>

- *Total Capital Ratio*, defined as Total Capital, made by the sum of Tier 1 and Tier 2, divided by RWA
- *Core Tier 1 Ratio*: Core Tier 1 represents the highest quality component of Tier 1 and it is expressed as percentage of RWA.

While the first two ones are regulatory metrics, the last is a common market benchmark that is widely used above all by rating agencies and equity analysts.

The recent financial crisis proved that this indicators could not be reliable enough and then regulators introduced a simplified and more robust metric, i.e. the Leverage Ratio. Actually this happens to be more a concept than an specific metric and could be defined as the ratio of Total Assets to Equity.

## **Pillar 2**

While metrics envisaged in Basel 2 Pillar 1 make up a standard yardstick to assess the capital adequacy across all the financial institutions, under the Pillar 2 banks are strongly encouraged to develop their own tailor-made-risk measures that, amongst the others, address some of the shortcomings of regulatory ones.

The unexpected loss is then represented by the economic or internal capital, that is a statistical measure assessing the maximum potential loss with a set confidence level<sup>2</sup>.

Economic capital as a matter of fact is supposed to capture the diversification amongst the different risk types and the concentration or diversification within each risk types.

These effects are not captured by the RWA because they are the sum of those related to trading items and credit positions, that means assuming no diversification amongst risk types. Moreover RWA are calculated on the assumption of credit portfolio perfectly granular, i.e. made by a very large number of counterparties totally uncorrelated.

Consistently with the economic capital concept, banks could develop their own metric of available capital, that could be wider than regulatory one or, as a first definition, equal to that. The related capital adequacy metric, often named *Risk Bearing Capacity*, is the ratio of available capital to economic or internal capital.

## **Other metrics**

Even if the aforementioned metrics include most of those commonly used, there are a few others ones.

For instance, further to the crisis, a new metric has been used to represent the banks' capital, the *Tangible Common Equity*, namely the equity less of preferred or saving shares and minus intangible assets that are more difficult to be disposed in critical situation or with very unpredictable selling price. The consequent capital adequacy metric is the ratio of TCE to RWA.

## **Usage**

It is recommended to include two-three variables in the risk appetite framework.

Of course at least one should be related to Pillar 1, and the choice depends on the strategic view of the bank: if it deems that both capital and funding are scarce resources in term of market availability, it should consider the total capital ratio. Otherwise it could deal with the Tier 1 or Core Tier 1 ratio, where the latter is most suitable should the bank be listed or publicly rated as it is a quite common market benchmark.

Pillar 2 metrics is quite useful for sophisticated institutions as it offers a complementary view than the regulatory one. Above all it is suitable for banks with a quite diversified portfolio or investment banks with large market exposures. Nevertheless capital ratios according to Pillar 1 and Pillar 2 must be set consistently to avoid any inconsistencies.

At any case leverage ratio should be included because it provides a more robust approach and a direct comparability with competitors, besides having been recently added as a regulatory requirement further to Basel 3.

### 1.3.4. Earning variability metrics

Shareholders are interested in the banks profits and their variability but while the former is out of risk appetite scope, the latter is.

The most obvious metric is the so called *Earning at Risk* (EaR) that represents the volatility of the profits. This is a statistical variable used as a proxy of the potential return variability.

This metric could be assessed under a historical perspective or a forward looking one, where the future volatility is expressed in function of the forecast business portfolio.

As for leverage ratio, EaR is more a family of metrics than an actual one as there are several degrees of freedom in defining it. Firstly there are different statistical procedures, data frequency and time series length, besides the different definitions of earnings that could be adopted, for instance:

- net profits or gross tax
- profits or other profitability measure such as EBITDA
- profits with/without extraordinary items

Another metric could be the *probability of loss*. Even if it sounds interesting, it is difficult to be measured and pretty unstable and therefore we do not deem as appropriate to include it in the risk appetite framework. Nevertheless this metric could be meaningful for banks with heavy trading operations where as a proxy the *number of days with negative Profit & Losses*.

In order to minimize the risk of losses a very useful indicator for commercial banks is the *cost of risk*, defined as the ratio of credit losses to credit exposure.

Credit losses could be expressed either as a dollar amount through provisions, that implies an accounting measure or with the expected losses, i.e. a statistical measure.

The latter could be easily defined at transaction level, while the provisions are more at portfolio level and so more difficult to be forecast, but have a close link with profitability. As a matter of fact even if provisions are a function of expected losses, they are set according to accounting rules such as IFRS or GAAP.

At any rate we would like to underline that provisions are the accounting representation of the credit risk, and therefore could be considered as a risk measure.

Credit exposure could be expressed in term of RWA, notional amount or Exposure At Default (EAD). Notional amount is the plainest measure but it is not very forward looking as it does not capture the potential evolution over time. This is represented by the EAD that is a statistical measure forecasting the exposure to a counterparty should it default, for instance fully using the committed credit lines.

On the other hand both of them do not provide an insight about the position risk, that is for instance measured with RWA.

Lastly we would also underline that earning variability must be included in the risk appetite because it directly impacts the capital adequacy as retained profits make up the largest capital source.

#### Usage

Commercial banks are highly recommended to adopt cost of risk as one of the metrics as credit risk happens to be the most important risk category. The exact definition depends on the overall strategy and on the availability of statistical parameters further to the adoption of internal models.

In order to facilitate the discussion with business functions, see section 1.5, it is better use as credit exposure the simple notional or RWA, while for credit losses the accounting provisions offering a more straightforward link with profit.

Most sophisticated banks are better to develop EaR but must have monthly time series in order to have a reliable statistical measure. That implicitly requires quite a good control system to achieve the necessary data quality.

The choice of the earning metric depends on the bank strategy in term of performance management: plain profits offer the clearest solution and the most straightforward alignment with shareholders' expectations and capital adequacy.

Nevertheless they are affected by tax code and extraordinary events most employees could not be accountable for, as discussed in section 1.4 and 1.5, highly regarded by equity analysts.

### **1.3.5. Liquidity metrics**

Liquidity proved to be the most lethal risk factor in the recent crisis and cannot be absolutely disregarded, as also underlined by the regulatory innovations.

Liquidity is actively managed by the banks and there are several metrics with this regard. The proposed approach is to include in the risk appetite the key ones that set the tone and then derive the other ones consistently in the liquidity policy, i.e. a guideline that sets out the rules for managing the liquidity and identifying the relevant metrics.

The risk appetite framework should at least include a metric for short term liquidity and another for the structural one, i.e. on the medium/long term.

As short term metric the *survival period* could be used: it is the time horizon bank operations could be kept should no other funding be available and the current one not being rolled over. Otherwise the *expected net cash flow*, or  $\text{gap}^3$  could be considered over a short time horizon like one month.

As medium term liquidity the *cumulated liquidity gap* could be considered or the ratio of assets and liabilities with expiry date above one year.

Naturally the new metrics proposed as part of Basel 3 namely the *Liquidity Coverage ratio* and the *Net Stable Funding ratio*, belong to this category, and they are respectively on the short and medium term.

### **Usage**

With regard there is no clear solution, provided that liquidity is covered on both short and medium term, therefore at least two indicators are recommended.

For the time being each institution could keep the metrics already in use, but should begin monitoring the new ones due to Basel 3.

### **1.3.6. Risk metrics**

Risk metrics could be directly included in risk appetite statement: they are implicitly included in the capital adequacy section.

For instance for an institution with relevant trading operation, it could be worthwhile introduce the maximum value at risk levels.

A key goal of this sections is cover those issues not included in the previous sections, for instance concentration risk because it is not captured by RWA. Therefore concentration metrics should be introduced as the maximum exposure of the five or ten customers, co called *concentration 5 or 10* (C5, C10) in comparison to the overall lending portfolio or equity. Naturally concentration could be meant in term of the main counterparties, so called single name, or industries. Should concentration be assessed with regard industries, the number of relevant exposures should be lowered to three or five.

This metrics turns out to be quite robust and not very data demanding while the indicator mostly used in economic literature, Herfindal or logarithmic indexes, happen to be very data intensive and not so easy to use. Moreover the exposures that could more directly cause a bank collapse are the largest ones.

Above all in this section *reputational risk* should be covered. With this regard financial nor statistical metrics could prove to be very reliable as a dented reputation could lead to total business disruption, as shown by the very quick collapse of Arthur Andersen further to their involvement in Enron default. Nevertheless some metrics could be introduced for the reputational risk, such as:

- Customer satisfaction
- News coverage
- Number of complaints

Of course such broad ones could be matched with more specific ones such as number of days to process a credit file for commercial banks while for brokerage houses the average time to process on order.

Even if such metrics are not expressed in dollar term, they actually represent a potential loss of profitability, i.e. a loss.

A key tool for risk management and control is stress testing that provides an assessment of potential losses and increase of risk in crisis conditions. Although it is gaining more and more ground in risk management and capital adequacy assessment, we would not include it as a metric in the risk appetite framework as it is more for controlling purposes and not for steering one because it represents a highly unusual situation. Nevertheless stress testing could be used to set targets and limits as described in section 2.3

## Usage

Provided that a metric on reputational risk is recommended, it could be the customer satisfaction that includes all the relevant issues, even if it should be clear that this metric has a pretty amount of noise as it depends on many factors out of the bank scope.

A concentration metric is needed for those institutions that do not use economic capital metrics in the capital adequacy section.

### 1.3.7. Business specific metrics

The four sections above provide quite a good coverage of the risk factors, nevertheless some institutions could deem of the utmost relevance introducing some specific measures.

An example is the *diversification of funding sources*: not only the aforementioned constraints should be kept, but also limits on the counterparties and products could be added to avoid that the sudden drying up of a liquidity source could doom the bank. For instance:

- Maximum amount of a single product like certificate of deposits or bonds on the overall amount of liabilities
- Maximum amount of liquidity provided by wholesale markets versus retail ones
- Maximum amount of liquidity provided by a single counterparty

Of course such diversification could be achieved by an increase of the cost of funding as it implies to rely also on less cheap sources, but this is a clear consequence of the bank risk appetite.

Another example is about distribution channels where if a financial institution relies on external agents or network, for instance asset management houses, it is appropriate to introduce a cap in the revenues through each channel.

In this section should be obviously included any metric related to insurance should the bank actually be a financial conglomerate.

## **Usage**

This sections should be adopted by institutions with quite a special risk profile that require a hoc metrics. Of course some of the metrics mentioned above could be included in other guidelines such as the liquidity policies.

### **1.4. Purposes of risk appetite**

Risk appetite, defined as above and represented by the aforementioned metrics, could be used for different purposes and therefore it is mandatory to define them as key component of the risk appetite framework.

The overall target is to ensure the long term viability of the business activities by avoiding excessive risk taking that could put in peril the bank operations. By the way this could be deemed as the key difference between control functions and business ones, that could be more linked to a short term view.

Firstly this is achieved by checking if the risk profile is aligned with the business strategy, and the understand if there is room for assuming additional risks or decrease them. In the former case, the most efficient use should be identified, for instance by reallocating the unabsorbed capital.

Secondly risk appetite provides senior management with an understanding of risks and business strategies that allows to establish boundaries for businesses to maximize value within.

Lastly risk appetite is managerial tool that also satisfies some regulatory requirements, mainly related to Basel 2 Pillar 2 (*see section 4*).

#### **1.4.1. Monitoring vs. business steering perspective**

The aforementioned targets could be achieved in two different manners, that is setting up risk appetite for a mere controlling purposes or as a strong leverage to steer the business.

For controlling purposes, risk appetite becomes a mere monitoring tool then it is used under a backward looking perspective. That implies it could include quite a large number of metrics, for instance more than thirty, with quite high level of details and it is mainly run by risk management department. All the remedial actions are then prompted on an “ex-post” basis and therefore could turn out to be too late and then ineffective.

Otherwise risk appetite could be used in a stronger way to steer the business with a forward looking approach. This requires risk appetite to be at least embedded in the planning process, and with a compact number of metrics to facilitate the multilateral discussion amongst risk management, planning and business functions and otherwise it could become overly cumbersome to be cascaded down.

However, a periodical risk appetite monitoring is put in place further to the budget.

In this paper we adopt the latter approach to provide the better support for a holistic ERM as the business steering is the actual added value of the risk appetite.

The monitoring purpose could be used as a preliminary stage to allow a full understanding of the metrics and then switch to a business steering one.

The different purposes impact quite heavily the shape of risk appetite framework itself, in term of:

- Interactions with other processes (*section 1.5*)
- Process to set risk appetite (*see section 2*), including choosing the metrics (*see section 2.2*)
- Governance (*see section 3*)

## **1.5. Interactions with other processes**

As stated above, risk appetite is meant to set the boundary conditions for business development, but the effectiveness of this role depends on how it is embedded into the other processes, namely:

- Planning
- Risk control, including the derivation of operational limits (*see section 2.5*)
- Performance evaluation
- Communication

The planning is the natural setting for the risk appetite and the interactions are described in detail in section 2.4, where the process of setting risk appetite is described while here the interactions with the other processes are analyzed.

### **1.5.1. Risk control**

Risk appetite is the key of risk control as firstly identifies the most relevant variables and then sets the yardstick to compare them to.

As a matter of fact risk appetite leads the senior management to set the maximum level of risk that could be tolerated and this is necessary to properly control risks as when they exceed the set thresholds, remedial actions are taken according to the escalation procedure described in section 2.6.

Furthermore the metrics that form the risk appetite framework set the tone for all the other risk variables (*see section 1.5*) and therefore assume a pivotal role in the risk control itself.

### **1.5.2. Performance evaluation**

Risk appetite effectively steers business only if the performance evaluation and the related incentive programs are linked to it. For instance if senior management performance evaluation and related incentive package are granted relying on a basket of indicators, those must include some risk appetite metrics.

Otherwise risk appetite metrics could act as pre-conditions for package payment, that is to say packages are paid in full or partially if and only if the risk appetite thresholds have been respected in the previous quarter/year.

To ensure the full alignment of people behavior with the risk appetite, it should be linked to performance measurement to the maximum level of detail as possible, i.e. cascading down to the maximum number of employees. This means identifying for each organizational level the most appropriate metrics to be used for performance measurement, and a pattern is proposed for sake of example:

- Senior Management
  - CEO, CFO, CRO: all metrics
  - Global Head of Business Lines: metrics regarding capital adequacy, leverage ratio, cost of risk, reputational risk

- Middle Management
  - Business Head at country level: all metrics at national level
  - Head of Business Lines: metrics at national level regarding capital adequacy, leverage ratio, cost of risk, reputational risk
- Operating level
  - Credit officer: cost of risk of managed portfolio
  - Trader: Value at Risk of the managed portfolio

A manner to include risk appetite in the performance evaluation is adopting value creation metrics where one component is the absorbed capital.

This is an implicit way that takes risk appetite quickly in the performance evaluation as such metrics are already used for this purpose but does not allow to understand clearly the actual impact of risks.

With regard to performance evaluation, a key issue is the accountability, i.e. the results of each manager should be assessed only based on the variable he/she can directly impact and is responsible for. Otherwise the incentive system turns out to demotivate employees.

For instance heads of business lines such as commercial banking should not be measured against survival period but on the leverage ratio as they command the amount of assets and not the full set of liabilities as wholesale funding is out of scope. Furthermore capital adequacy ratios should be assessed with regard their business lines only.

Nevertheless some firm wide metrics could be introduced according to a kind of solidarity principle even if this requires a careful balance with potential impact to managers' motivation.

### **1.5.3. Communication**

Risk appetite is then completely effective if it supports the company communication to the stakeholders and other market players.

As a matter of fact a clear statement and communication of risk appetite are key elements in the evaluation by:

- shareholders, actual or potential, to assess if the expected premium is consistent with the risk embedded
- debtholders to decide if purchasing bank's liability
- rating agencies in the assessment process

Furthermore risk appetite makes up a good managerial practice that cannot be not included in the analysts evaluations.

The first channel of communication of risk appetite is having it as a key element is presentation to analysts, both in presenting results, budget or industrial plan. Consistently it should be always included in the review with rating agencies

Naturally the risk appetite must be part of the more formalized communication in term of financial report and disclosure regime under Pillar 3 of Basel 3.

It is taken for granted that risk appetite is reported in details to the supervisory authorities.

We would also like to underline that risk appetite is a very powerful tool not only with regard external communication but also internal one because it provides a clear understanding of the strategic attitude of the bank and if the current level of risk are acceptable or not.

## 2. Process

Setting a risk appetite as described above requires an exhaustive process that we could represent as made by the following steps, each of them described in a dedicated subsection.

### 2.1. *Risk identification*

The first phase of the risk appetite setting is identifying the risks assumed by the bank in order to be sure they are fully included in the framework.

Most complex risks such as credit and market should be articulated in subcategories, for instance with regard the latter according to risk factors:

- Equity risk
- Interest rate risk
- Credit risk<sup>4</sup>
- Liquidity risk<sup>5</sup>
- Foreign Currency (FX) risk
- Commodity risk
- Volatility risk
- Correlation risk

Credit risk could be declined according to the business activity:

- Commercial lending:
  - counterparty risk that coincides with issuer risk
  - concentration risk with regard single name and industries
- Trading
  - derivatives and security lending: counterparty risk
  - securities: settlement/presettlement
  - bonds: issuer risk

Then it is necessary identifying the scope of risk appetite in term of business lines and/or subsidiaries to be included in the analysis and the risks associated to each of them.

This phase is often overlooked but a careful assessment of risks bears a huge added value as it allows to recognize the potential sources of losses besides offering a chance to review the risks embedded in each business line and product.

### 2.2. *Choosing metrics*

The second phase is choosing the metrics making up the risk appetite framework within those described in section 1.3.

With this regard the following criteria could be outlined:

- overall purpose, as stated above. Here we choose a risk appetite framework fully embedded in the planning process, and therefore with a small number of metrics, e.g. about ten
- the nature of the bank, that is to say
  - universal vs. specialized, either commercial or investment banks
  - global vs. regional or local<sup>6</sup>
  - relying on internal vs. standardized models<sup>7</sup>

For sake of example we propose three paradigms of bank types and the consequent risk appetite framework.

**Table I: Paradigms of risk appetite framework for different bank types**

Bank type	Cross Border	Investment	Commercial
<b>Features</b>	<i>Universal</i>	<i>Specialized</i>	<i>Specialized</i>
	<i>Global</i>	<i>Global</i>	<i>Regional/local</i>
	<i>Internal model</i>	<i>Internal model</i>	<i>Standard model</i>
<b>Risk Appetite Metrics</b>			
<i>Cap adequacy</i>	Tier 1/ Core Tier 1 ratio	Tier 1/ Core Tier 1 ratio	Total Capital ratio
	Leverage ratio	Leverage ratio	Leverage ratio
	Risk Bearing Capacity	Risk Bearing Capacity	–
<i>Earning Variability</i>	Earning at Risk	Earning at Risk	–
	Cost of Risk	Number negative daily PL	Cost of Risk
<i>Liquidity</i>	Survival Period	Survival Period	Survival Period
	Structural liquidity	–	Structural liquidity
<i>Reputational Risk</i>	Customer satisfaction	–	Customer satisfaction
	News coverage	News coverage	News coverage
	Number of complaints	–	Number of complaints
<i>Business specific</i>	–	Max repo as funding	Concentration risk
	–	Max daily VaR	–

### **2.3. Setting targets and limits**

The full implementation of the risk appetite needs that for each metric a target and limit to be set in order to define what is the optimal level and the acceptable one.

The suggested approach is setting an overarching criterion and then declining it to settle targets and limits for each metric.

With this regard we suggest that it could be either a target rating or capital remuneration, main driver of share price, according to a bondholder or stockholder point of view according to what is deemed as the key objective. That means there are some primary variables while the others are derived as follows.

In the debtholder perspective the bank aligns to the implicit requirements related to a rating target that could be also expressed as a target probability of default. The main variables are then capital levels and liquidity buffers because they represent the first guarantee against default while profits and their variability are set consistently with the capital absorption. For instance capital ratios could be directly inferred from the rating agencies guidelines or by the a comparison with the competitors with the target rating.

Shareholders are keen on return on capital and so the metric to be checked it is if the bank is able to generate enough profits to remunerate the capital invested according to an equity premium function of the return variability, where the latter two ones are risk appetite metrics. Liquidity boundaries are then set according to the profit levels.

For sake of example a proposal is presented on how to set targets and limits for under a debtholder perspective also because this is quite close to supervisors' and governments' expectations.

The suggested approach is to prioritize the variables and then for each of them to set firstly the target or the limit and then obtain the other accordingly.

Below are reported some examples of target and limit setting, mainly focused on capital adequacy variables, as they are the primary ones in the chosen approach.

Tier 1 and Total Capital ratios have a minimum level set by the regulatory requirements currently set at 4% and 8%, that under Basel 3 will be increased to 6% and 10.5%<sup>8</sup>. Nevertheless already nowadays some supervisors deem as appropriate a Core Tier 1 level at least of 6%. Therefore the limits could be matching the regulatory requirement as described above.

Targets are, on the other hand, set according to the target rating or benchmarking analysis, as they are not foreseen in the regulatory framework because they must to be decided by the bank in the Internal Capital Adequacy Assessment Process (ICAAP, see section 4).

The set target and limits should be robust, i.e. hold in whatever market conditions, and therefore targets and limits should undergo a scenario analysis, e.g. checking that under a crisis the decrease from the target value is above the limit.

This approach could otherwise be used to set the target starting from the limit or vice versa, that means calibrating them is stress testing.

It is worth to underline this represents a sizeable increase of the traditional scope of scenario analysis, and in particular stress testing, firstly because it implies to widen the metrics it is applied to and above all because it moves from the mere risk controlling to business management.

Risk bearing capacity has a natural limit to 100% and the target could be set either with the scenario analysis or by setting a desiderate ratio between RWA and economic capital, having set the available capital consistently with budget forecast.

The structural and short term liquidity, expressed both by the cumulative liquidity gap should be set according to the forecast about the capacity to raise funding on the medium term, i.e. the gap between the assets and liabilities should be equal to the new funding. The target is set according to the expected values while the limit on pessimistic assumption. The difference of the two is a manifestation of the risk tolerance of the institution. With this regard a fundamental element are central bank decisions on the financing lines as they are the main liquidity provider. Consequently a limit for survival period could be the frequency of refinancing auctions, or a multiple.

The key indicator of profit variability is cost of risk where the target value is set according to volume and provision forecast as in the budget, where the latter are set consistently with the expected macro-economic scenario<sup>9</sup>. The limit value is set consistently with a non loss option, i.e. equal to the gross margin under a pessimistic view.

Reputational risks indicators are so single-institution specific that no general example could be provided.

The other risk metric needed to be included addresses concentration risk, that is better measured by the capacity to face losses that is represented by the capital, therefore it could be expressed as percentage of exposure to the main counterparties to equity, for instance top 3 exposures (c5) up to 20% . With this regard there is quite a similar indicator under the regulatory reporting.

### **2.3.1. Warning levels**

As limits represent the thresholds not to be breached, it could be useful complement them with warning levels, that is to say critical values that should activate remedial actions. This is very important for low-frequency metrics, i.e. variables assessed on a quarterly basis such those related to financial reporting.

The most accurate approach for defining warning levels would be assessing the statistical distribution of the risk appetite metrics to assess their variability between one assessment and the following one, but as previously stated that is too much data demanding. Therefore a proxy could be assessing for instance the maximum quarterly variation in the last three or five years and set the warning levels the limit plus such maximum variation.

Otherwise a very pragmatic solution is setting the warning level at a fixed point in the range between the limit and the target, e.g. one third.

### **Final remark**

The full risk appetite framework foresees that for each metric a target, limit and warning level should be defined. Nevertheless each institution could decide not to set some of the aforementioned thresholds such as the target for a metric, should it not being meaningful or to grant business functions more degrees of freedom.

For instance it could be deemed there is no optimal value for the leverage ratio but it makes sense only as a constraint to avoid an overstretched funding structure.

## **2.4. Embedding into planning**

The risk appetite framework risks being a mere exercise unless it is not embedded in the bank processes, mainly the planning because in this way it could effectively impact business decisions. As a matter of fact the risk appetite makes up the boundary conditions to be met in the planning and therefore act as constraint for the business optimization and the consequent achievable profit level. That means risk appetite represents a fundamental tool to ensure a sustainable development on the mid-long run as the lack of any risk boundary would lead to short-term profit maximization by assuming excessive risks that could put bank survival at peril.

The risk appetite should be set at the beginning of the budget, in term of metrics, according to the governance outlined in section 3, as well as a first version of proposed targets and limits. This framework should be endorsed by senior management and then communicated to the business functions as an input for the planning. That requires a thorough discussion between the CFO, CRO and business functions, firstly to explain the metrics and how they are cascaded into operations, for instance in limit setting (*see section 2.5*)

The proposed targets and limits should be reviewed at each step of the planning to verify its consistency with the achievable profits. For example the amount of capital over the next year is forecast and set capital adequacy ratios, that implies a maximum amount of risk that can be assumed. This sets a constraints to the profits that could be obtained and should they be lower than the target, there are two options, either lowering return expectations or augmenting the risk tolerance, that means for instance decreasing the capital ratios or increase the leverage ratio.

The approval of the budget means also approving the risk appetite that is a key component of its.

## **2.5. Limit setting**

The proposed risk appetite framework envisages a few risk variables that set the tone for all the other ones, that should be derived from the former in order to have a set of operational limit consistent with the risk appetite.

A first example are the criteria for credit granting where the customers are given a probability of default according to the internal rating systems, that is the basis for provisioning. The cost of risk metric, cascaded down to the portfolio level, forces relationships managers to cut off customers with an excessive risk.

Another example is setting market VaR limits for trading operations: the capital ratios sets the amount of available capital that is then allocated to each business line. The allocated capital is then broken down to each desk and then transformed from a yearly time horizon to a daily one.

## **2.6. Monitoring and escalation**

Further to the risk appetite setting, regular monitoring needs to be set up, in terms of kind of control, frequency of reporting and related addressees where the current risk levels are compared to the targets and limits.

The triplets made by target, limit and warning signal introduce a kind of risk appetite framework light signaling:

- Red: below the limit
- Amber: between the limit and the warning levels
- Green: above the warning level, even if it does mean the target to be achieved.

Should be the actual levels in the first two zones, the appropriate escalation process should set up, as described in section 3.

## **3. Governance**

The risk appetite framework built is a complex process that requires the proper organizational structure and could imply changes in the corporate governance currently in place in terms of involved functions and the role of decision making bodies.

### **3.1. Functions involved**

To properly set the governance the first step is appointing the functions owner of setting and monitoring the risk appetite.

The proposed key feature of using risk appetite framework in the budget leads it to be under the joint responsibility of *CRO* and *CFO*. This kind of partnership is needed to fully embed risk appetite into the planning process.

Within the joint effort it is appropriate to identify their contribution, for instance the ownership of each metric in terms of:

- Assessing the metric
- Setting the target
- Setting the limit
- Reporting
- Proposing remedial actions

In some cases there could be also for joint ownership for a variable for instance when there are two components, such as the risk bearing capacity where available capital and economic capital are respectively under *CFO* and *CRO* competence. In other cases the *CFO* could be in charge of all the activities but limit setting that is upon *CRO* as risk controller.

Only under special cases business functions could be tasked to assess the metrics but that could undermine the reliability of the metric due to the potential conflict of interests.

Business functions have an active role in the risk appetite as they are those who take decisions under a risk-reward basis for instance make a budget consistent with the risk appetite. Therefore they must be actively involved in reviewing the metrics and challenging *CFO* and *CRO* proposals.

Remedial actions are proposed by CFO and/or CFO while in many cases they could be a joint initiative with business functions, because they are in charge of the first level of risk management<sup>10</sup>. For instance in case of a breach in the daily VaR, risk management must force the reduction of risk levels, but are the traders to decide if dispose some assets or hedge them.

It should be taken for granted the role of other functions, for instance the Internal Audit to ensure the integrity of the processes.

## **3.2. Governing bodies**

### **3.2.1. Senior management**

Neither CRO, CFO or business functions could decide on the risk appetite framework as none of them is able to settle the trade off between risk and return, because everybody is related with only one side of the equation.

As a matter of fact the senior management<sup>11</sup> is responsible for the company management and therefore has the power to take this kind of decision. For instance in case of lowering of the capital ratios, the CFO should verify with the business functions the derisking for instance by shrinking loan granting, assess the potential impact on profitability and then propose senior management either to reduce business volume or increase capital with issuing rights or hybrid debt. It is then senior management that is able to make this decision because, for instance business functions could dislike deleveraging while CFO would be skeptical about asking the markets for additional resources.

We would like to remind that senior management could adopt, amongst the other options, a temporary suspension of the risk appetite metrics, for instance should the increase of risk be due to a spike in market volatility with the bank's positions stable over time. In this case the suspension must have a pre-defined maturity, e.g. two-four weeks, and then reviewed or even it could not be renewed. It would be appropriate internal audit to be promptly informed to avoid a mere neutralizing the controlling mechanisms.

Another option is to change the targets and limits, but only under special market conditions that lead to a budget review. This procedure should be formalized and part of risk appetite framework.

Senior management represents the first level of escalation in case of breach of the warning levels and the limits. In a more detailed way it must be promptly informed of the breach and must immediately discuss the remedial actions proposed by CFO, CRO and business lines.

### **3.2.2. Board of Directors**

Senior management acts on behalf of and within the delegated powers by the Board of Directors (BoD) that represents the company shareholders.

That means the risk appetite metrics, their limits and targets must be approved by the BoD as an integral part of the budget. It is of the utmost relevance shareholders have a say about the risks to be assumed to achieve the targets and also assess they are consistent with the other stakeholders' requirements or expectations, for instance supervisors. Consequently any change in the risk appetite metrics should again be approved by BoD further to a senior management proposal.

In case of limit breach, it is necessary senior management informs BoD and presents the remedial actions, asking for approval if needed, e.g. in case of asset disposal or right issuing. That does not apply for the warning signals as they are a managerial tool.

Lastly BoD must approve, or at least must receive for disclosure, the communication to external counterparties, also with regard risk appetite.

### **3.3. Extension to subsidiaries and business lines**

A key decision in the implementation of risk appetite is to decide to what level cascade down the risk appetite.

That means first of all address the related trade off as the lower is the level risk appetite is taken to and :

- higher is the consistency of business decisions and risk appetite, that means lower likelihood of boundary conditions to be breached
- higher is the required effort e.g. in term of organizational structures, training and support by CFO and CRO

A pragmatic solution could a step-by step reduction of the metrics cascaded down, for instance:

- all of them apply at Group level
- all but three apply at country/global business line level
- from three to five apply at business line level in a country
- one or two are used by operatives, for instance cost of risk by credit officers and market VaR by traders.

To facilitate cascading down risk appetite metrics, some of them could be transformed, for instance capital adequacy metrics could be expressed in maximum amount of risk to be assumed, as represented by RWA or economic capital. Another example is representing the leverage ratio for commercial functions as the ratio loans to deposits, as these two variables are under their competence. Such reshaping simplifies the picture and also reflects the accountability principle as central functions, such as finance, are usually responsible for raising capital while front functions to take on risks as consequences of business decisions.

We would like to remind that cascading down stems directly from the first phase of the process to set risk appetite, i.e. the risk identification.

The decision on the entities, both business lines and subsidiaries, to cascade risk appetite and to what extent, should be made by senior management and approved by the BoD as a key lever of the risk appetite framework. Furthermore if risk appetite framework is cascaded to a subsidiary, also its BoD must approve it in alignment with the parent company guidelines.

## **4. Regulatory requirements**

Even if risk appetite setting is above all a powerful managerial tool, banks have to comply with the rules set out in the regulatory regime.

In a more detailed fashion, the regulatory framework firstly provides a set of compulsory metrics that enter *de jure* in the risk appetite statement, such as Tier 1 or Total Capital ratios. This role has been expanded under Basel 3 as it has introduced metrics also for liquidity, namely the Liquidity Coverage ratio and the Net Stable Funding ratio,

In the mean time regulatory framework provides with relevant thresholds for such metrics, that become in most cases natural limits as they could not be breached.

Nevertheless the relevant regulatory discipline for risk appetite is the Pillar 2 of the Basel 2 framework, made up by two components, Internal Capital Adequacy Assessment Process (ICAAP) and the Supervisory Review and Evaluation Process (SREP).

The starting point of ICAAP is that Pillar 1 represents the minimum capital requirements, while banks are expected to operate at higher capital levels that should be set by the bank according to its own decision making process and internal assessment, i.e. ICAAP.

Further to the bank ICAAP, there is the SREP where the supervisory authority reviews the soundness of the risk appetite both in term of metrics, process to set it and output, forcing the bank to take remedial actions in case.

## **5. Other industries**

In the previous sections the risk appetite framework has been presented in such a general terms that could be implemented in other industries with the same structure.

As a matter of fact the component of the risk appetite framework and the setting process as well as the governance are exactly the same, while the main differences with the banking industry are the lack of regulatory requirements as well as different metrics to represent different risk factors.

For sake of completeness two examples of risk appetite framework implementation in non financial industries are introduced below where are described the differences from the process as represented for the banks.

### **5.1. Oil company**

Oil industry is the closest to banks as it enjoys the highest level of integration with financial markets as the oil price is set mainly on future markets.

Hereby a differential analysis is performed in comparison to the process as described in sections 2 and 3.

#### **5.1.1. Risk identification**

The financial risks taken by an oil company are:

- Commodity
- Foreign currency, for instance part of revenues in euro and US dollars, oil paid in US dollars and wages in euro
- Interest rates with regard funding

Nevertheless oil company suffer not only form financial risks but also liquidity and reputational ones, as any other company, including banks, plus operating ones as dramatically highlighted by the Deep Horizon collapse. In a more detailed fashion, reputational risks are related not to the final output, but on how it is obtained.

With this regard a key issue is the market increase of awareness in anti-bribing campaign, phenomenon that often plagued the oil industry during the auctions to grant exploring and property rights.

#### **5.1.2. Choosing metrics**

As any other company, an oil one must take care of the balance of equity and assets, therefore leverage ratio could be kept to ensure a robust capital structure. Moreover this metric is fundamental to reach higher rating classes.

For liquidity survival period could be used as well as another metric as the average maturity of expiring debt to have a look on the medium term. As a matter of fact this is quite simplified equivalent of the survival period on a longer time horizon.

The tolerance to such operational risks<sup>12</sup> must be part of the risk appetite and could be expressed, for instance, in term of redundancies of the security systems. And therefore the company should settle the trade off between the costs of higher security levels and the decrease in the probability of collapse and/or its severity. Nevertheless in this case the reputational impact should be considered.

With this regard it is highly recommended the company actively engage ONG such as environmentalist to prevent reputational damages.

For the earning variability EaR is perfectly fine while it is appropriate to introduce a concentration metric, i.e. the percentage of revenues stemming from the largest oil producer field. That allows to understand how much the profit could change should the concession be canceled.

The chosen metrics are represented in Table II

## **5.2. Manufacturing car maker.**

Besides the oil industry that is quite close to the financial markets, a more “traditional” industry is considered, i.e. automotive.

As in section 5.1, the analysis is performed in a differential way in comparison to sections 2 and 3.

### **5.2.1. Risk identification**

The financial risks taken by an automotive company are:

- Interest rates with regard funding
- Foreign currency, mainly due to the revenues as sales are spread around the world

Naturally also an automotive company is exposed to liquidity, operational and reputational risks. The latter is mainly due not to the production process, but to the quality of the output, then slightly different from an oil company.

### **5.2.2. Choosing metrics**

What discussed for the oil company applies to the automotive company, with a few slightly differences.

Firstly the variability of revenues is due to the largest markets or the most successful model: a high value of this variable underlines a weaker profitability structure.

Then customer satisfaction, and their complaints are critical elements and lastly industrial companies could have quite a high number of litigations due to the working conditions.

In this case the company could set a limit and the excess to be covered with special insurance companies besides investing in prevention.

**Table II: Paradigms of risk appetite framework for different industries**

	<b>Oil</b>	<b>Car Maker</b>
<b>Risks</b>	<i>Commodity</i>	–
	<i>Foreign currency</i>	<i>Foreign currency</i>
	<i>Interest rate</i>	<i>Interest rate</i>
	<i>Reputational</i>	<i>Reputational</i>
	<i>Operational</i>	<i>Operational</i>
<b>Risk Appetite Metrics</b>		
<i>Cap adequacy</i>	Leverage ratio	Leverage ratio
<i>Earning Variability</i>	Earning at Risk	Earning at Risk
	Revenues from the largest field(s)	Revenues from the bestseller model(s) or largest market(s)
<i>Liquidity</i>	Survival Period	Survival Period
	Average Debt Maturity	Average Debt Maturity
<i>Reputational Risk</i>	–	Customer satisfaction
	News coverage	News coverage
	Environmentalists complaints	Number of complaints
<i>Business specific</i>	Security levels	litigation

## 6. Conclusions

Given the fundamental role that the risk appetite could play in the company management, its implementation should be carefully performed and special attention should be paid on how to avoid some pitfalls that could undermine its full effectiveness.

As a matter of fact risk appetite should be

- Clearly stated and its interactions with business activities specified
- Strongly Endorsed, that requires:
  - Involvement of Senior Management
  - Approval by the Board of Directors
- Shared and understood, that means avoiding:
  - Any “Black box” or “guru-on-the-mountain” approach that prevents any effective engagement from the business side
  - Lack of iterative dialogue with the businesses for instance in the different steps of the planning process
- Made by metrics with good process and governance
  - Identifying responsibilities and roles
  - Setting up a monitoring process

Nevertheless the biggest trap is to set a kind of “paper process” that does not impact the actual business steering.

<sup>1</sup> In a more detailed fashion the Tier 1 is made up by equity plus some debt instruments named “hybrids” minus some items to be deducted as shareholdings in other financial institutions. RWA are the weighted sum of the banks’ assets by coefficients, usually between 0 and 100%, that represent their risk. Tier 2 is made up by debt instruments that are the most junior of all, besides the hybrids.

<sup>2</sup> Economic capital should be the aggregated economic capital, i.e. the aggregation of the economic capital related to single risk types. Basel 2 legislation speaks about internal capital that is supposed to

<sup>3</sup> The net flow, or gap, is represented as the difference between cash inflows, positive, and the cash outflows, negative. As it is a forward looking measure, it is a forecast. With this regard a key issue to be ruled by the liquidity policy is the counterbalancing capacity, i.e. the amount of securities, mainly government bonds, that could be sold or repoed to increase liquidity.

<sup>4</sup> Here it is expressed in term of credit spread risk

<sup>5</sup> Here it is meant the liquidity of security, i.e. the depth of the market and the potential losses due to its thinness

<sup>6</sup> A bank is labeled as regional if it carries out operations in more countries while local if only in one country or even to a smaller extent

<sup>7</sup> Internal models have to be understood both as used for regulatory reporting, i.e. calculating RWA, or as economic capital assessment

<sup>8</sup> Including the Capital Conservation buffer set to 2.5%

<sup>9</sup> Internal rating systems represent probabilities of default as a function of macro economic variables and then from a forecast of the latter, a one of the former can be obtained.

<sup>10</sup> According to the regulatory framework there are three levels for risk management: 1. on line control performed by the business functions themselves 2. risk management functions that perform an independent review 3. internal audit that ensures the process integrity

<sup>11</sup> In this section we mean as senior management either the CEO or a collective body such as the management board, chaired by the CEO

<sup>12</sup> By the way, the Basel definition of operational risks fits also other industries as they are due to system, process failures or human errors.