BUSINESS RISK MODELLING METHODS AND PRACTICES

DISCUSSION NOTES

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TRUE NORTH PARTNERS
FINANCE | RISK | STRATEGY

Table of Contents

Overview of today's talk

- Introduction: background and motivation
  - Why are our clients working on business risk?
  - What are the components of business risk modelling?

- Definition of business risk
  - What risk types are included in business risk definition?
  - Should business risk be capitalized?

- Approach to business risk
  - Where and how should business risk be managed?
  - How should the modelling of business risk align to its management?

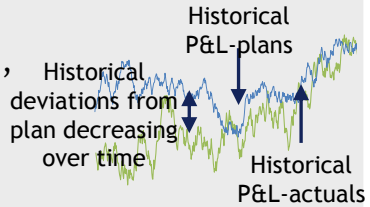
Why are our clients working on business risk, apart from regulatory requirements?

Close gaps in the risk universe / ERM framework

- Business Risk closes gaps in the risk universe in terms of a ***top-down*** definition assessing adverse changes in volumes and margins not attributable to other risk types
- A ***bottom-up*** intuition of this residual risk is contingent on the bank's risk universe mainly containing strategic and reputational risks
- The explicit definition is bank-specific

Incentivise planning and execution quality

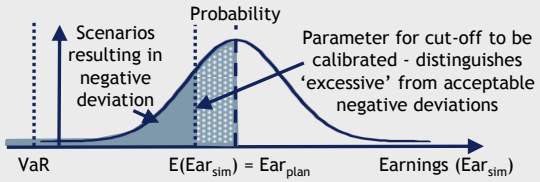
- Business risk as a measure of P&L-volatility around plan and, hence, ***planning precision*** in an economic/business environment



- ***Drivers*** of volumes and margins as basis for the Business Risk capital model
- To "maximise" value added, the model needs to be informed by planning and, vice versa, the planning process needs to be informed by the model

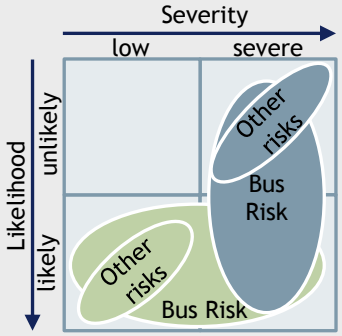
Manage earnings volatility or "body risk"

- Expected and unexpected (non-tolerable) plan deviations
- Capturing body events to maintain "business as usual": expected dividends, planned initiatives, …



Improve scenario analyses and stress testing

- Stress scenario assessment as strategic and reputational components might be likely but not observed historically
- Expert input to enhance the model with a forward looking view accounting for current changes in market environments and business models



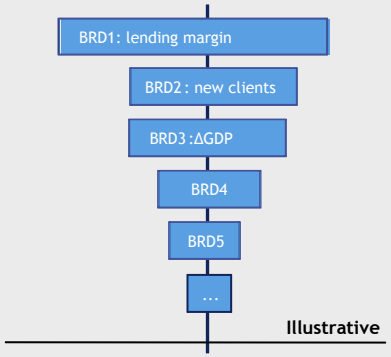
A Business Risk framework builds on three key components which should be tailored specifically to the institutional context

- Illustrative -

1 Definition

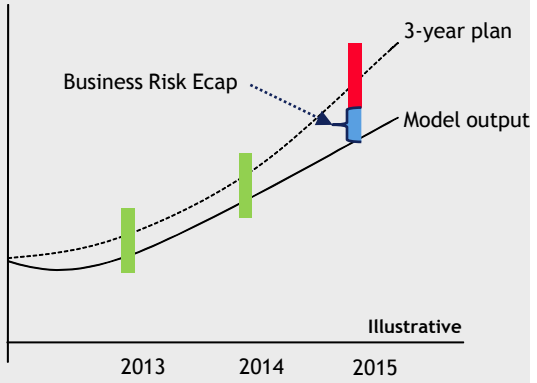
- Define Business Risk, especially with respect to
  - Risks that may or may not be included; or should be included in other risk types
  - Risk types that should explicitly be accounted for
  - Risks that historically may have emerged in the form of other risk types; e.g. P&L impact of credit strategy

2 Drivers



- Segment the business into different "business models" with distinct risk characteristics (e.g. Asset Management vs. Trading)
- Identify (together with the business and finance areas) a set of Business Risk drivers/ parameters for each of the business models
- Focus on drivers used in the planning & budgeting processes

3 3. Model



- Develop a model for the business areas exposed to business risk as per the definition
- Right-size modelling approach and target model sophistication to the respective area's (business) risk profile
- Use a robust aggregation methodology for business risk of different business models and with other quantified risk types

Table of Contents

Business Risk can be defined as the risk of earnings fluctuations around the plan caused by events not attributable to other risk types

- Illustrative -

Top-down definition

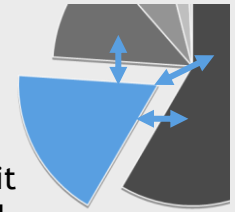
- Strip out the P&L-effects of all risk types already quantified in the Ecap
- The remaining residual is Business Risk, i.e. the risk of a deviation from planned earnings due to events not attributable to other quantified risk types
- A top-down view reduces risk of
  - Overlaps (double counting)
  - Gaps (close the circle)

Bottom-up intuition

- A purely top-down view lacks intuition
- Motivate coverage by providing specific examples e.g. pertaining to
  - Strategic Risk
  - Reputational Risk[1]
  - "Container" of Other Risk

Delineation from other risk types

- The effects captured under Business Risk could also encompass strategic counterparts and the reputational impact of all other risk types
- Examples include e.g.
  - The non-credit impact of a credit related strategy for e.g. secured lending business (strategy driven by Credit Risk whereas the impact materialises in e.g. P&L or via reputational effects)



Potential Business Risk definition

- Business Risk is the risk of an unexpected and/or expected deviation of earnings from its plan due to changing margins, fees or volumes (e.g. number and size of transactions) caused by events not attributable to risk types that are quantified elsewhere according to the risk taxonomy, with no opportunity to be offset by cost reductions
- Business Risk covers typically
  - "business-as-usual" elements (body-risk/EaR focus)
  - stress events (tail-risk/VaR focus)

[1] Some elements of Reputational Risk are potentially being quantified under other risk types as consequential effects

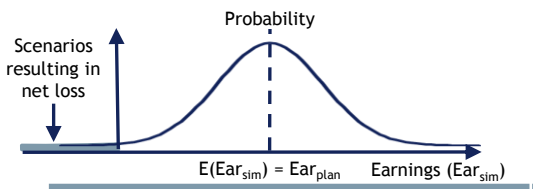
Practices around defining business risk

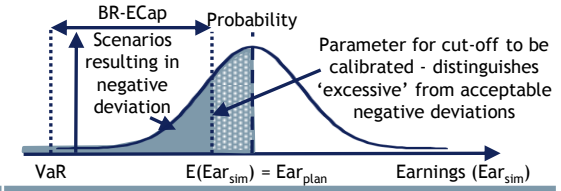
- There is no general consensus on a best practice definition nor measurement of Business Risk: A suitable notion is driven by the organisational context:
  - Existing risk universe: definitions and assessments
  - Historic "risk" incidents and business models
- Typically Business Risk is referred to "the risk of volumes decreasing or margins shrinking with no opportunity to offset the revenue decline with a reduction in costs …"
- Choosing a top-down definition of Business Risk as a "residual" measure of P&L-volatility not attributable to other risk types accounts for the above intuition
- An exhaustive bottom-up definition of the constituents is only rarely given; major components are Reputational and Strategic risk as well as strategic counterparts of other risk types in the risk universe
- To provide benefits beyond calculating "yet another risk number", Business Risk should ideally
  - Link into existing budgeting & planning processes
  - Cover items beyond the balance-sheet, e.g. fee-generating services
  - Reflect business-as-usual & stressed environment

Constituents of Business Risk in different institutions	
Economic environment risk	Competitive environment risk
Financial market risk	Regulatory risk
Political risk	Legal risk
Tax risk	New product risk
Stakeholder risk	IT risk
Reputational risk	Pension obligation risk
Strategic risk	Securitisation risk

Approaches to modelling Business Risk vary widely	
Coverage of (non-interest) expenses	Business Risk defined as non-interest expenses represent unavoidable expenses in the short run
Share price analyses	Business risk defined as impact on earnings from adverse business decisions which are reflected in the share price
Analogue method	Business Risk inferred from those of non-bank businesses (e.g. from industry mix for wholesale) and scaled to bank's rating
Modelling of volatility of income and cost streams	Business Risk modelled based on individual value/economic drivers of most important revenue and cost components

Determining a distribution of earnings deviations from plan is the basis for Business Risk capital; different concepts and thresholds can be used

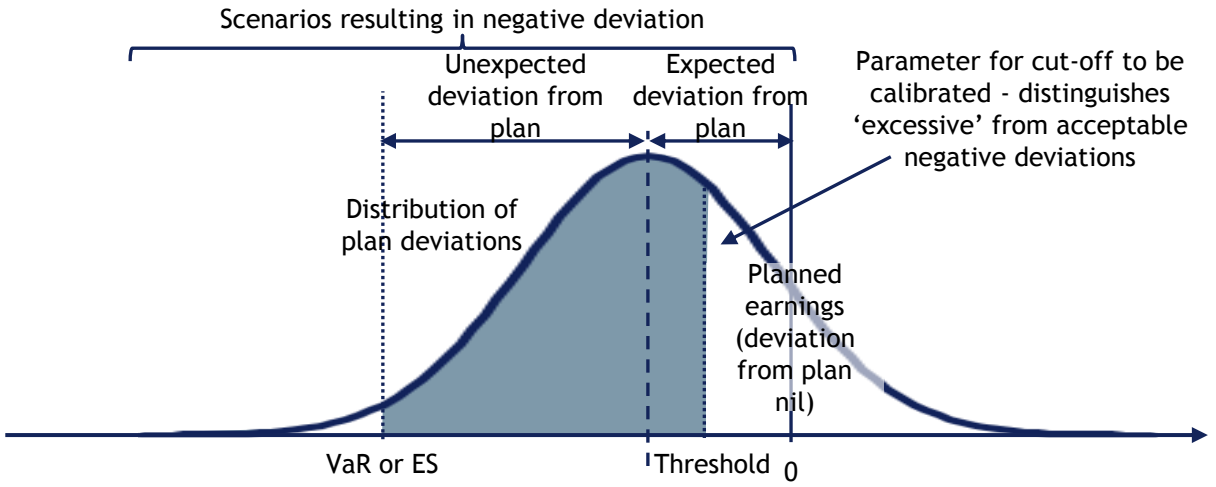




	Net losses	Negative deviation from plan
Definition	▪ Business Risk capital is held to cover the risk of negative earnings, i.e. a net (operating) loss ▪ Closer to a VaR definition where only extreme events need to be provisioned for	▪ Business Risk capital is held to cover negative expected and/or unexpected deviations from plan (note that expected deviations in general are not nil) ▪ Closer to an EaR definition where more frequent events in the body of the distribution are picked up
Pro	▪ In line with measurement concept and confidence level of other risk types ▪ Idea of providing for (unexpected) losses more 'intuitive'	▪ Business Risk events likely to be more relevant in body of distribution e.g. also for management action regarding financial stability, dividend payments etc. ▪ More consistent with definition of capital supply which includes expected earnings ▪ Incentives to improve planning/controlling ▪ Better data quality
Con	▪ Results for tail likely to be less stable and more sensitive to assumptions & parameters ▪ Potentially low/counter-intuitive capital results ▪ Higher data requirements	▪ Sensitive to planning assumptions ▪ Not all negative earnings deviations within control of management ▪ 'Calibration' to lower threshold of deviation may be required

The definition of business risk capital should be aligned to other methodologies, such as the definition of capital supply

- Illustrative -

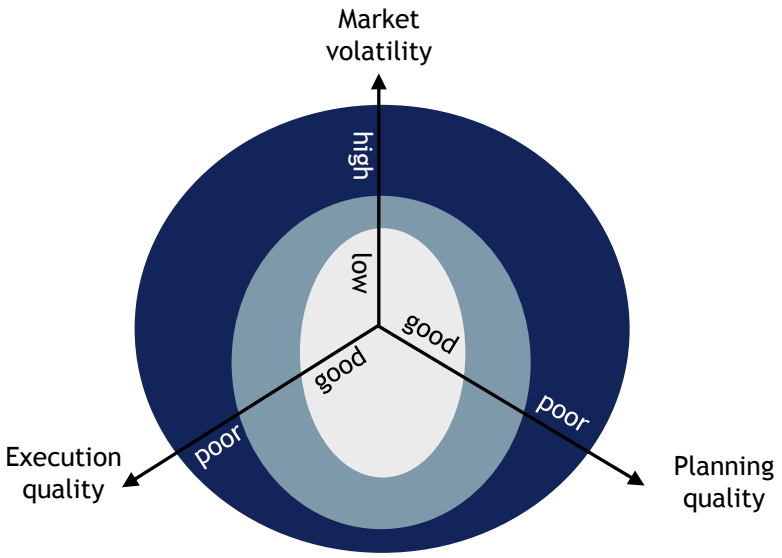


- Even when the definition of the type of scenarios relevant for Business Risk is accepted in principle, a conscious choice should be made regarding the exact cut-off parameter:
  - *Any* deviation from planned figures may be too punitive and render results less stable and robust
  - A purely statistical variance around expected values may not reflect effect of underlying BR drivers
- Setting the precise level of 'excessive' negative deviations from plan will be informed by the following considerations:
  - A sensible margin of error for deviations (whether only negative ones or any) should be set in line with overall level of desired sensitivity
  - That lever for calibration could also be distinguished by the various levels of application e.g. in the organisation (see above table)
- Level of confidence for resulting distribution of earnings deviation should be set in line with overall risk & management purposes
- The threshold takes account of the fact that
  - Plans are overly ambitious and in fact not expected to be met
  - Expected severe events are currently not taken into account in planning
- Hence the expected deviation from plan is not necessarily nil
- A sensible value for the threshold depends on the aggressiveness of the capital supply within the Institution

Table of Contents

A leading business risk framework should incentivise better planning quality and reward strategy execution, also in difficult markets

- Value is added by defining Business Risk as the risk of plan deviation due to
  - Poor planning and execution quality
  - A volatile, non-projectable market environment
- Metrics of volumes and margins used in planning and controlling serve as tangible Business Risk drivers
- The Business Risk model is specific to business models and, hence, to business units in a bank
- The ability to plan and execute well results in relatively low unexpected and expected deviations and, hence, low Business Risk capital and vice versa
- Besides encompassing a VaR-type measure, to achieve the above objective, a model should
  - Also feature a body-risk EaR-type as these figures are more useful for financial planning and strategy considerations
  - Factor-in a proven history of planning accuracy and consider how current plans account for volatility/uncertainty
  - Incorporate a forward-looking perspective particularly by expert opinion on planning accuracy particularly for stress events

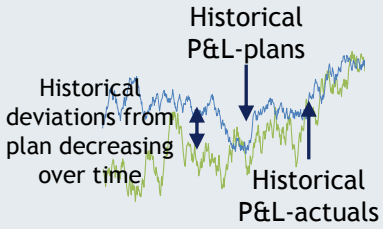


Low	Good planning and execution results in relatively low unexpected deviations and, hence, low Business Risk capital despite some market volatility
Med	Market uncertainty is hard to represent in planning and execution leading to increased Business Risk capital
High	Relatively high unexpected deviations and, hence, increased Business Risk capital due to market uncertainty and/or poor planning/execution

Expert input plays a major role in business risk models to be reflective of business going forward

Reflection of data

- Only data taken into account that is reflective of business going forward
- Tendencies in data projected further as e.g. decreasing volatility of earnings around plan



- Inclusion of next period plans

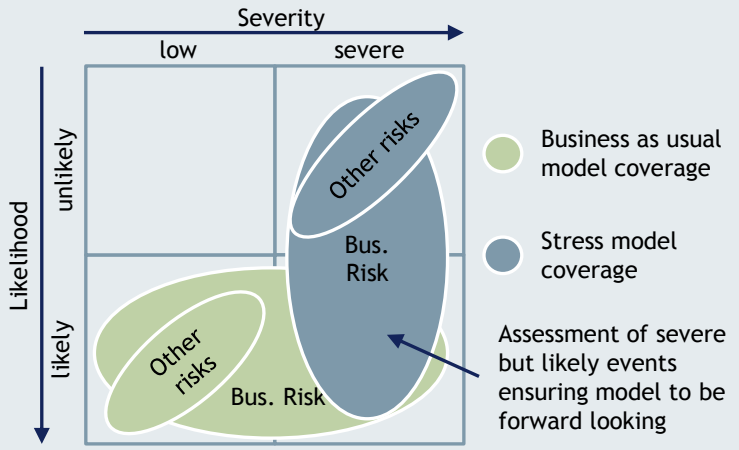
Amendment of data

Tendencies not reflected in historical data:

- Structural / organisational changes
- Strategic changes (e.g. new market targeted that is more predictable decreasing overall volatility around plan)
- Recent developments not in historical data
- Lessons learned in planning from historical events // reasons for past plan deviations now taken into account in planning exercise as e.g. a severe event captured in historical data now being planned for by conservative growth assumptions (specific examples to be given and respective contribution to volatility to be stripped out)

Stress scenario integration

- For most risk types, there is a correlation between being unlikely and being severe
- Severe Business Risk events might be likely or but not included in the plan nor observed in history (e.g. new competitor)
- This property is due to being primarily composed of strategic and reputational risks
- The model accounts for this fact by including severe events not historically observed in the model
- If stress events have been observed in history, they are already included in the distribution

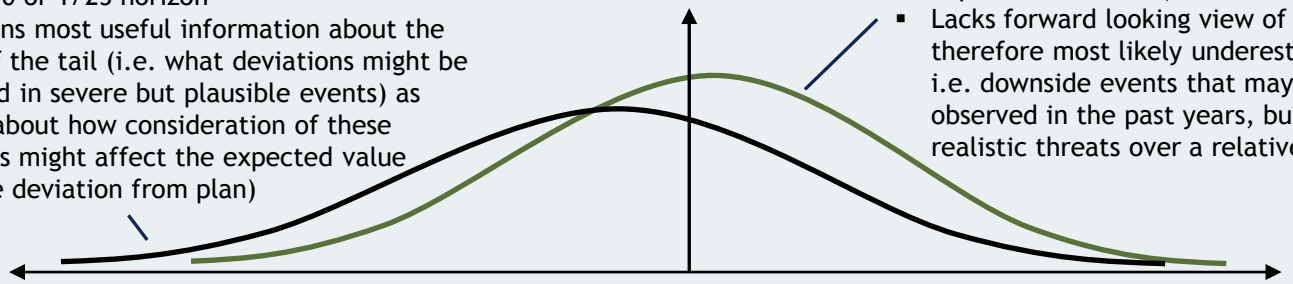


Ideally, a business risk model should also include forward looking stress information

- To obtain a distribution of earnings deviations from plan capturing all information, two key elements are combined
  - Historical information which is "statistically robust", reflects "Business as Usual", but might ignore key features that are most relevant in the future, particularly regarding stress scenarios
  - Forward-looking expert judgement, especially around stressed scenarios and strategic risks, which by its nature is "judgemental" and must therefore be carefully controlled in terms of the process of how it is obtained
- The two sources of information are combined to generate a single "blended" distribution of earnings deviation from plan, that best captures all available historical and forward looking information
  - Blending is done primarily at the BU-level, as this is the level at which expert judgement is obtained for now
  - Going forward, more granular expert judgement should be obtained, i.e. at the level of risk drivers

Distribution obtained based on expert judgement around potential stresses

- This captures the expert (forward-looking) judgement on "stress" scenarios, i.e. deviations from plan that might happen in a 1/4, 1/10 or 1/25 horizon
- It contains most useful information about the shape of the tail (i.e. what deviations might be expected in severe but plausible events) as well as about how consideration of these scenarios might affect the expected value (average deviation from plan)



Distribution obtained from historical information

- Is most accurate around its centre (i.e. body of distribution, reflecting moderate deviations from expected outcomes)
- Lacks forward looking view of stress scenarios; therefore most likely underestimates "tail risks", i.e. downside events that may not have been observed in the past years, but are plausible and realistic threats over a relatively short time horizon

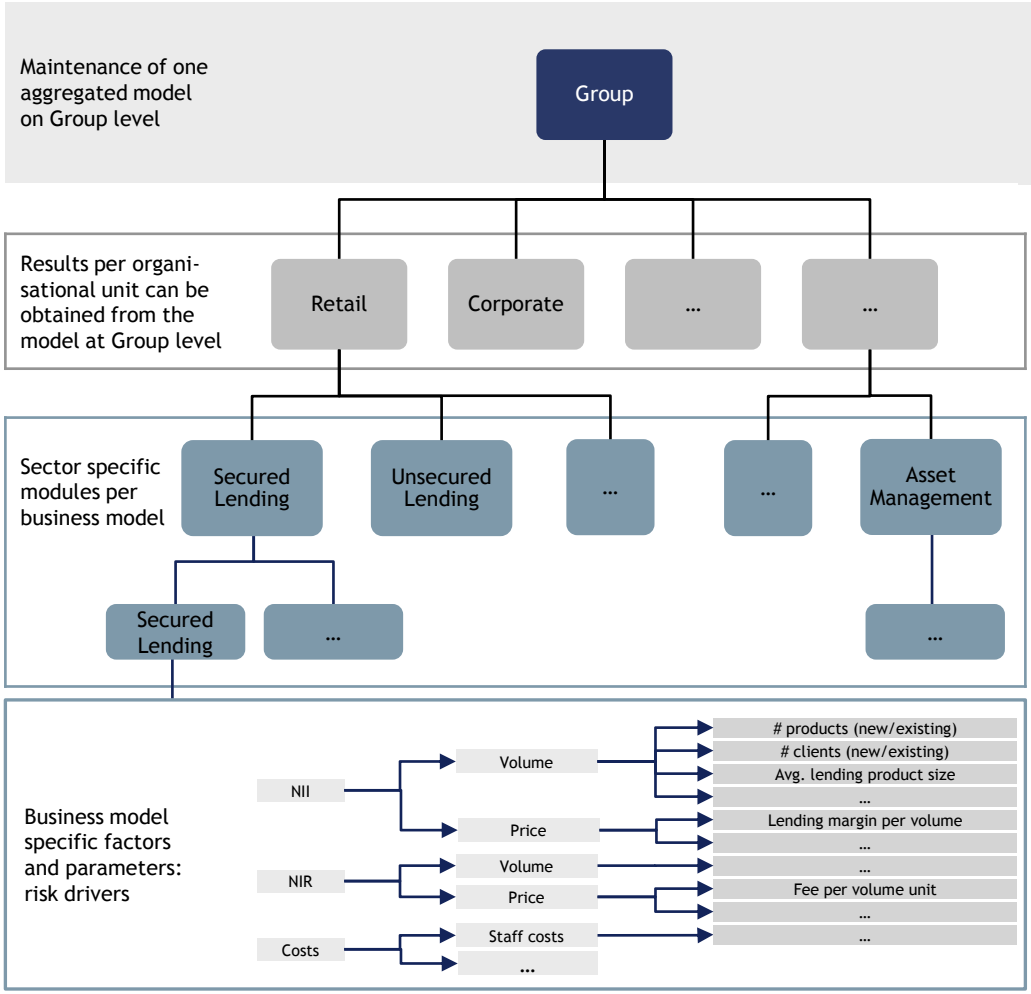
In the model, both distributions are then "blended" to a single distribution incorporating historical as well as stress information

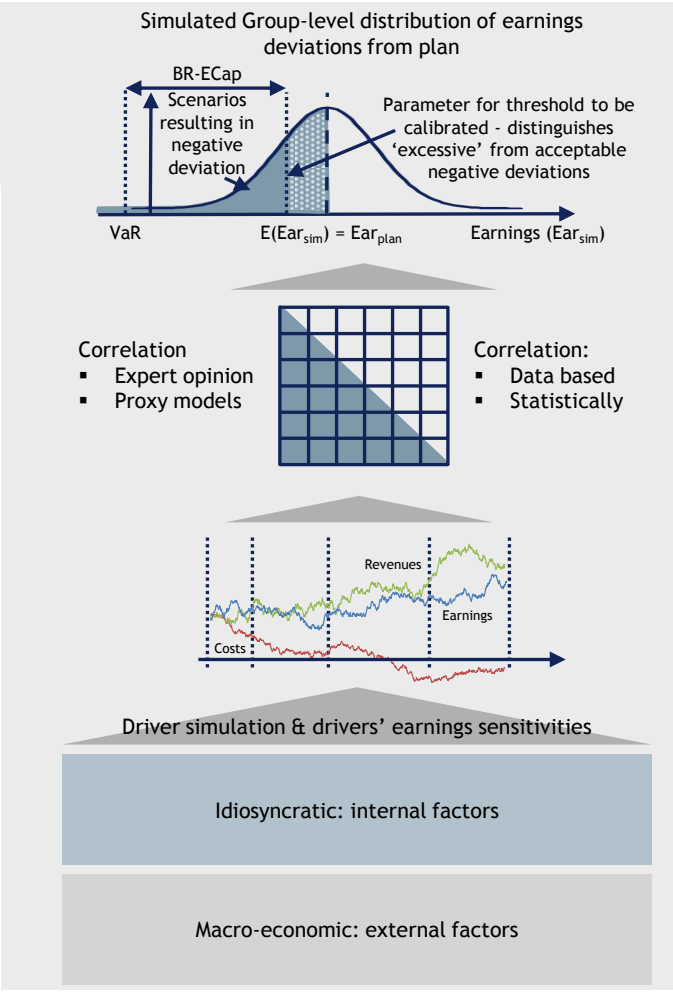
The sophistication of the modelling approach should be carefully matched to the requirements and constraints

Key features	Qualitative approach	Analytical approach	Simulation approach
Identify, categorize and describe business risks within BUs (or business models)	▪ Scorecard approach to identify and categorize business risks at the level of BUs, sub-BUs or relevant business models	▪ Calculate (planned) earnings volatilities due to business risk based on historical data ▪ Incorporate expert input	▪ Define business risk stress scenarios (incl. likelihood and severity), based on expert input
Identify and understand business risk drivers	▪ Identify business risk drivers and incorporate these into scorecard	▪ Measure volatility of business risk drivers ▪ Model (quantify) impact of business risk drivers on (planned) earnings volatility	▪ Incorporate non-normal business risk drivers to better reflect historical data on business risk drivers
Quantification of business risk	▪ Triangulate overall (top-down) level of business risk ▪ Allocate business risk down to BUs based on scorecard categorization	▪ Model driven by BU (or business model) level earnings volatility, assuming normal distributions ▪ Potentially the model is driven directly by business risk drivers	▪ Incorporate stress scenarios, which requires handling of non-normal distributions
Process required to embed model	▪ Risk management ▪ Top-down ECAP	▪ Collect expert input as part of planning process	▪ Involvement of BUs in stress testing

Overview of bottom-up simulation model

- Illustrative -





Thank you.