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Leverage RRP scenario modelling as a strategic advantage

Ten design principles for the new paradigm

RRP Viewpoint

October 2016

pwc

Glossary

APAC	Asia-Pacific
BAU	Business as usual
CET1	Core equity tier 1
ELAC	External loss-absorbing capital
EMEA	Europe, Middle East and Africa
EUR	Euro
FMU	Financial market utility
FX	Foreign exchange
GAAP	Generally accepted accounting principles
HQLA	High-quality liquid assets
IFRS	International Financial Reporting Standards
ILAC	Internal loss-absorbing capital
LAC	Loss-absorbing capital
LCR	Liquidity coverage ratio
NSFR	Net stable funding ratio
PoNV	Point of non-viability
RRP	Recovery and resolution planning
RWA	Risk-weighted assets
SIFI	Systemically important financial institution
TBTF	'Too big to fail'

Preamble

Stress testing, in general, and the scenario modelling related to it, in particular, are increasingly important. Primarily, this is because the scope such models have to cover is expanding and the level of accuracy required of them is rising.

While certain models are growing more sophisticated in and of themselves, we also observe attempts to strengthen the links between individual models with the aim of developing an integrated stress-testing solution. Such a solution attempts to provide a holistic understanding of the modelled situations and to help steer the business strategically by linking business benefits and their corresponding risks dynamically at various stress levels. The range of stress levels ranges from business planning to resolution planning (as the outlier of the tail risks).

With regard to modelling specifically for Recovery and Resolution Planning (RRP), we envisage that fundamental enhancements to individual models will be made, driven by a new paradigm of RRP scenario modelling and the requirements of RRP. Moreover, we predict an increasing impact on stress testing as a whole due to the embedding of RRP into an integrated stress-testing approach.

At present, the market leaders in stress testing are still specifying their vision of the target state for an integrated stress-testing solution. On the other hand, the RRP scenario modelling requirements have recently become tangible. We believe that any residual uncertainty concerning the definition of an integrated stress-testing solution will have only a limited impact on the new paradigm in RRP scenario modelling and on the related design principles. Therefore, we see a valid business reason for assessing and enhancing RRP scenario modelling today, as it will facilitate the integration of RRP in a potential future integrated solution.

In light of this, the present RRP Viewpoint focusses on the opportunity to leverage RRP scenario modelling as a strategic advantage and provides design principles relating to the new paradigm.

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Executive summary

The role of RRP scenario modelling

The importance of a firm's scenario modelling capabilities for Recovery and Resolution Planning (RRP) will increase in the coming years. In fact, the growing demands on a firm's scenario modelling capabilities mark a new paradigm both in addressing regulatory requirement and in providing strategic tools to management.

A new paradigm with new objectives

Historically, RRP scenario modelling has been primarily a compliance issue. Recently, however, management at industry leaders has started to give more recognition to the strategic benefits of RRP scenario modelling.

Meeting the regulatory requirements concerning RRP will enable domestic and host regulators to:

- Validate a SIFI's resilience, including sensitivities; and
- Understand and manage a SIFI's risk exposure.

Perhaps even more important is that RRP scenario modelling provides strategic management tools:

- An assessment tool to sharpen understanding of a SIFI's vulnerabilities, including the quantification of the related triggers;
- A reverse stress tool to forecast the maximum liquidity drain and capital loss a SIFI can absorb within a given period without reaching an RRP 'turning point' (e.g., PoNV) as well as the ability to optimise strategically the allocation of resources within a SIFI enhances significantly its resilience and resolvability; and
- A decision-making tool for severe crises, during which the generally applicable economic assumptions fundamentally change and reliance on the classical stress-testing approaches becomes inappropriate.

Ten design principles

- This RRP Viewpoint describes the ten RRP modelling design principles of a strategic solution that balances the benefits of scenario modelling and the effort it requires:


1) Accuracy


2) Completeness


3) Consistency


4) Granularity


5) Comprehensiveness


6) Adequacy


7) Clarity/usefulness


8) Transparency


9) Adaptability/flexibility


10) Efficiency

These ten design principles are detailed further by providing the underlying cornerstones for RRP scenario modelling for each of the ten design principles. These cornerstones are derived from the key requirements of RRP scenario modelling and the corresponding challenges.

What it means to you

Under the new paradigm, RRP scenario modelling will be enhanced substantially. Those firms that adopt this industry trend earlier get a competitive advantage in terms of regulatory compliance and gaining access to strategic tools that can help management mitigate the impact of even an extraordinarily severe crisis and sustain the company's business through the turbulence.

The scope of this RRP Viewpoint

In the following, we specify each key design principle by describing the underlying cornerstones that we recommend considering when building an RRP scenario model to meet the future requirements.

Note that this RRP viewpoint does not focus on:

- Aspects related to model governance or the review and control of models;
- General matters concerning the integration of the finance, treasury and risk functions; and
- The operational process of establishing a target solution.

Our point of view

Role of RRP scenario modelling

The importance of a firm's RRP framework and its contribution to protecting a firm's business will continue to increase over the coming years. Higher demands on a firm's scenario modelling capabilities – an inherent part of the RRP framework – will mark a new paradigm in both addressing the regulatory requirements as well as providing management tools.

Industry trend of scenario modelling

We note that the industry is adjusting its modelling approach in favour of a strategic solution in order to meet both management's and regulators' changing requirements:

1 Historically, RRP scenario modelling has been mainly a compliance issue, i.e. designed to meet regulatory requirements. Typically, management didn't leverage the insights from RRP models for its own purposes. Often, RRP models were very simplistic, siloed and largely kept separate from the other BAU stress-testing models.

2 Over time, management started to use the results from BAU stress-testing models and made top-side adjustments in order to reach the stress levels required for RRP purposes. But, due to a lack of functional integration of finance, treasury and risk, the models remained functionally segregated.

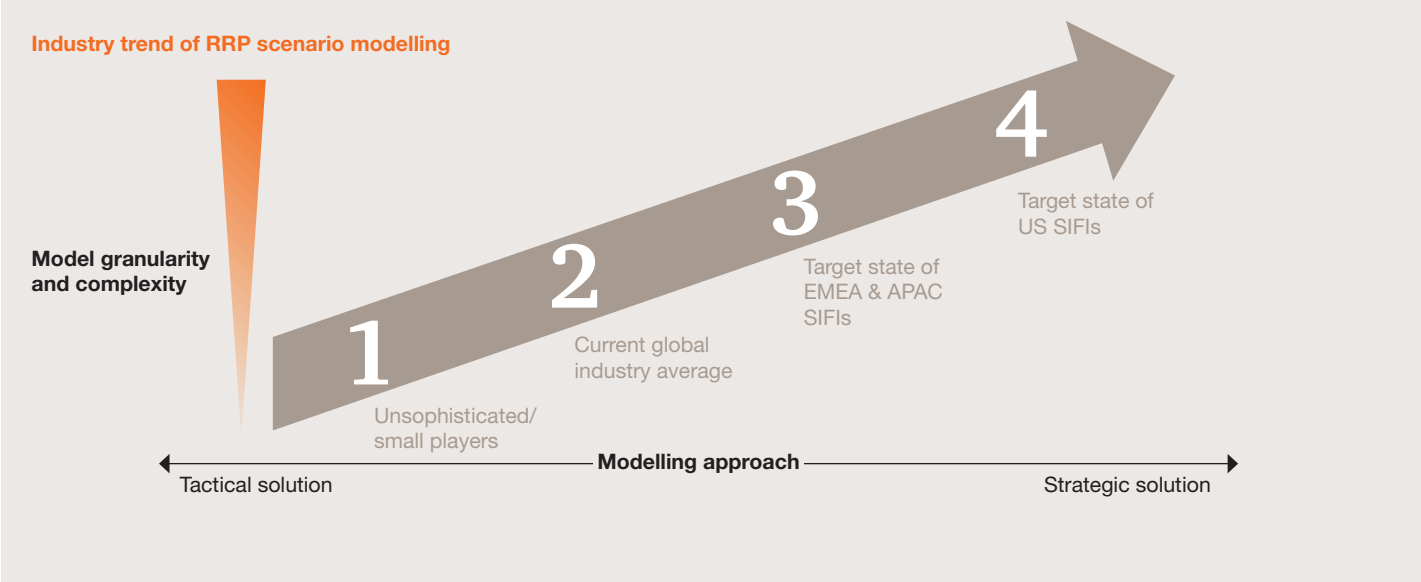
3 In the EMEA and APAC regions, we observe industry leaders functionally integrating RRP-relevant stress levels into their BAU stress-testing models. Nevertheless, as the functional integration of finance, treasury and risk generally remains challenging, the models remain functionally segregated for the moment. RRP-specific impacts (e.g., FMU reactions) are generally included as judgment-based elements in order to manage the model's level of granularity and complexity.

4 In the US, we observe industry leaders setting up solutions similar to those in EMEA and APAC in terms of integration into BAU stress testing and functional integration. However, such models are largely statistics-based and rely only to a very limited extent on judgment-based elements. Consequently, the models tend to be more granular and complex.

While industry leaders around the globe have improved substantially their RRP scenario modelling capabilities, it is not clear whether the EMEA/APAC and the US modelling approaches will eventually converge.

The new paradigm of scenario modelling

The new paradigm of RRP scenario modelling shifts the key objectives towards providing powerful insights to management and regulators on a firm's turning points under extraordinary stress. But, such objectives are not without challenges. We believe a principles-based approach is recommendable in order to balance a firm's RRP requirements and the effort needed to address the challenges in meeting them.



Objectives of RRP scenario modelling

Objectives of the new paradigm

The quality of RRP scenario modelling has recently increased at SIFIs as management has gained a better understanding of its strategic relevance.

RRP modelling objectives

- Meet explicit and implicit **regulatory requirements**
- Provide ex-ante and in-crisis **management tools**

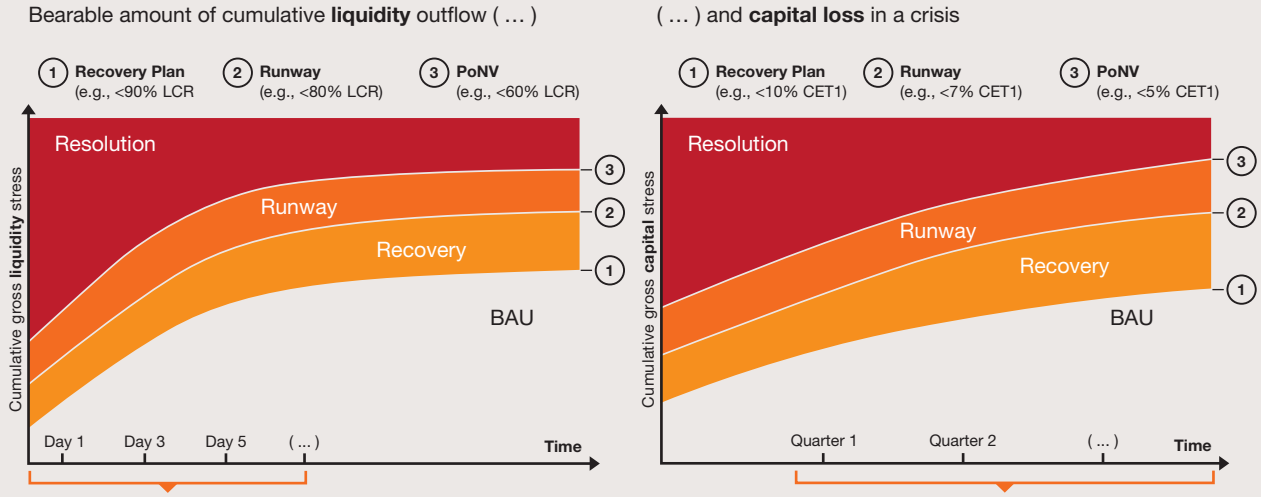
Meeting the RRP regulatory requirements will enable both domestic and host regulators to:

- Validate a SIFI's resilience, including its sensitivities; and
- Understand and manage a SIFI's risk exposure.

Beyond meeting the explicit and implicit regulatory requirements, future RRP scenario modelling provides the following management tools:

- An ***assessment tool*** to sharpen understanding of a SIFI's vulnerabilities, including a quantification of the related triggers. The tool provides insights on which actions might be taken at what point in time for a given severe stress scenario. RRP scenario modelling also shows the interrelationships between liquidity and capital, including the respective liquidity and capital ratios, in such a crisis. These insights allow for the optimisation of the liquidity and capital allocation within a group. This significantly increases efficiency and effectiveness and enhances resilience and resolvability;
- A ***reverse stress tool*** to forecast the maximum liquidity drain and capital loss a SIFI can absorb within a given period without reaching an RRP turning point (e.g., PoNV). The ability to locate turning points efficiently highlights the areas that can help improve resilience. While the capacity to absorb a liquidity drain focusses on the short term, the capacity to absorb capital losses focusses on the medium- to long-term view. Benchmarking existing BAU stress-testing scenarios and RRP scenarios against absorption capacity provides an immediate insight into the resources remaining before reaching the next RRP turning point; and
- A ***decision-making tool*** for extreme crises, i.e. those in which generally applicable economic assumptions change fundamentally and reliance on classical stress-testing approaches becomes inappropriate.

Objectives of the new paradigm – absorption capacity



Liquidity crises typically emerge in the short term and are addressed by rapidly increasing absorption capacity through liquidity measures (…)

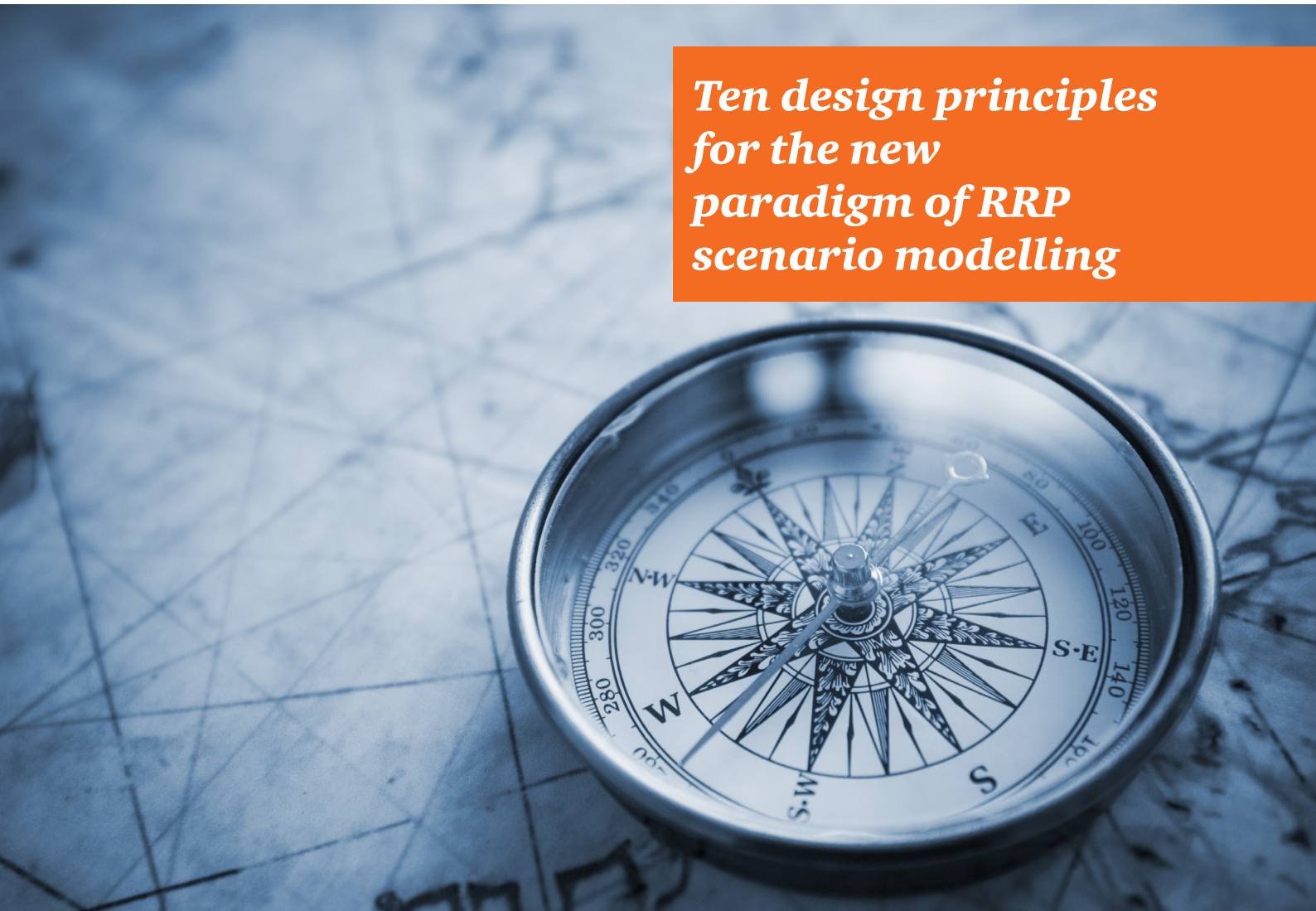
(…) while **capital crises** typically emerge in the long term and tend to impose challenges over time.

Consequences of the new paradigm

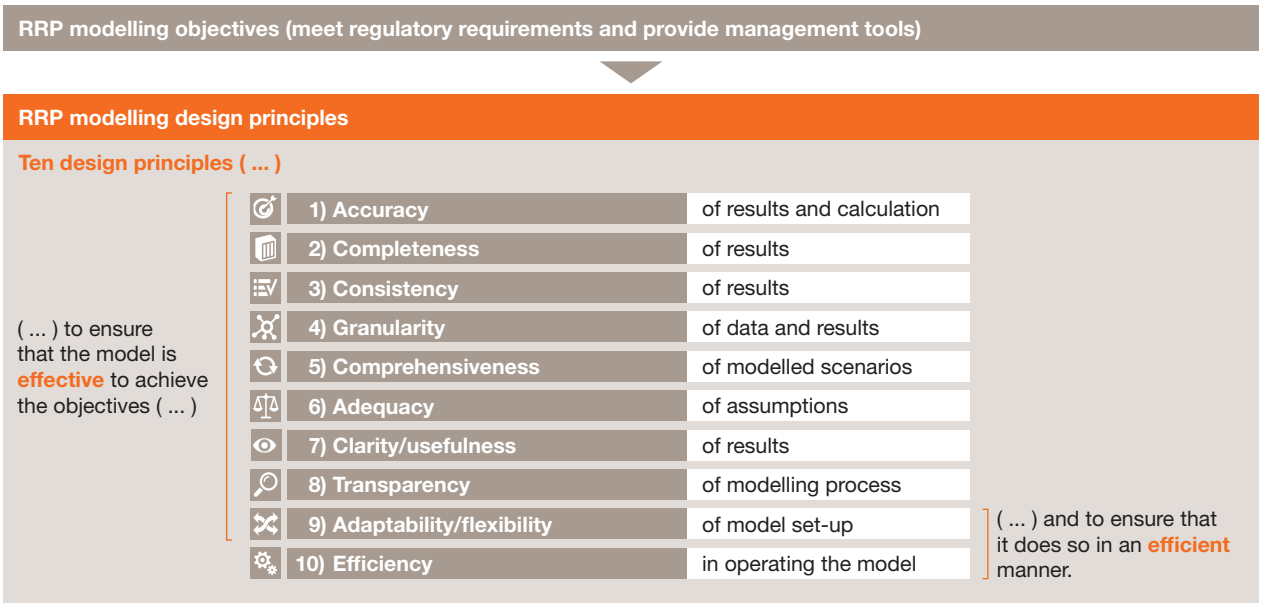
RRP scenario modelling will significantly improve over the coming years in order to maximise the opportunities for management and to meet the increasing compliance requirements from a regulatory perspective. Indeed, the industry leaders have already moved beyond planning and have started implementing strategic solutions.

In the following, we provides ten modelling design principles and their underlying cornerstones that enable firms simultaneously to meet management's and the regulators' requirements.

Ten design principles for the new paradigm of RRP scenario modelling



Ten RRP modelling design principles



Ten design principles to address the challenges of RRP scenario modelling

The objectives of RRP scenario modelling relate to a broad set of requirements, which imposes challenges to setting up the required modelling capabilities. Ten design principles address these challenges and provide a guideline to RRP scenario modelling that is both effective and efficient.

1 Accuracy ▸ RRP scenario modelling has to provide accurate results in terms of measuring and calculating sufficiently precise estimates of the actual values that need to be tracked.

Accurate results are indispensable in order to build a basis for robust and precise decision-making. The broad range of aspects that affect RRP scenario modelling, however, creates a risk of extending a model's scope beyond the optimum. Any incremental extension to a model has to be weighed up carefully in terms of the model's efficiency and complexity (e.g. the correlation between any newly added aspect in the model and those aspects already included). Consideration of materiality is, therefore, crucial.

Accuracy starts at the bottom with 'as-is' accounting data that needs to be processed for modelling purposes without any distortion. A full reconciliation with accounting data not only contributes to accuracy but is also an enabler for the design principle 8) Transparency. This is especially so when accuracy is ensured continuously by means of corresponding checks throughout the modelling process. The accuracy of the calculations and results of the RRP scenario modelling depend on the correct consideration of interdependencies between model factors. Such dependencies might be positive correlations (e.g., when the effectiveness or the costs of recovery options rise with the stress level) or negative correlations (e.g., when recovery options are mutually exclusive). Due to these dependencies and the risk of overlaps in the quantification of the respective recovery options, all recovery options should be mapped for a single dataset and require the dynamic quantification of effects, rather than predefined absolute amounts.

Further, the model needs to account for aspects of valuation in resolution to ensure the accuracy of the results.

Accuracy 1

- Ability to reconcile fully with accounting data and inclusion of corresponding checks
- Consideration of dependencies/correlations between the model's input variables
- Dynamic quantification of the impact of recovery options (i.e., no absolute amounts)
- Valuation aspects in resolution

2 Completeness ▸ RRP scenario modelling has to provide complete results in terms of covering all relevant financial dimensions (e.g., balance sheet, RWA and LCR) for the legal entities and business lines concerned.

Ultimately, RRP scenario modelling needs to assess the impact of a stress event on liquidity and capital in order to conclude on the viability of a group and its individual entities.

2

Completeness

- Balance-sheet-centric modelling approach
- Further coverage of CET1 ratio (CET1 and RWA, including split into risk components):
  - Leverage ratio
  - ELAC/ILAC
  - LCR (HQLA and net outflow risk)
  - NSFR (available and required stable funding)
  - Profit and loss statement
- Modelling risk indicators at group and entity levels

Historically, most SIFIs used siloed models for their BAU stress testing. The models designed for observing liquidity risks largely didn't consider capital aspects, whereas the models designed to observe capital risks largely neglected liquidity aspects. As these models were often used to perform RRP scenario modelling, SIFIs rarely had holistic models that provided an integrated view on the balance sheet, including liquidity considerations (e.g., LCR and, thus, HQLA and outflow risk), while also providing a view on capital aspects (e.g., CET1 ratio and, thus, regulatory capital, as well as RWA for market, credit and operational risks). The lack of suitable RRP scenario modelling to capture such spill-over effects was a major obstacle to providing a complete picture of a severe stress scenario and to assessing the viability of a SIFI and its individual legal entities.

For RRP scenario modelling, we recommend a balance-sheet-centric approach whereby the on- and off-balance sheet impacts are derived initially. All other financial dimensions (e.g., profit and loss calculation, regulatory capital calculation and the LCR, NSFR or CET1 financial ratios) can be derived largely based on the modelled on- and off-balance sheets using a simplifying proxy approach. Considering the broad range of required financial dimensions, a careful balancing of effort and accuracy is required.

The relevant risk indicators as defined at the group and entity levels (e.g., early warning, invocation of the recovery plan, start of the runway period and invocation of the resolution plan/PoNV) need to be modelled, too, in order to benchmark the respective RRP scenario results against their respective thresholds along the scenario timeline.

3 Consistency ▸ RRP scenario modelling has to provide consistent results by delivering non-contradictory and aligned information within an individual RRP deliverable, across the RRP deliverables and compared with the related BAU stress-testing results.

In the coming years, we foresee an increasing number of RRP deliverables for each SIFI, combined with an increasing level of detail and specification of those deliverables. Additionally, management's information requirements will grow. In light of this trend, there is an increasing risk of providing inconsistent information.

To ensure data consistency, RRP scenario modelling needs to rely on a single dataset covering all aspects of one type of information (e.g., all balance sheet data should be sourced from the same dataset and source). Once a common baseline has been defined (e.g., a deliverable for a domestic regulator should structure the line items according to IFRS and have IFRS valuations in EUR), adjustments for local deliverables (e.g. GAAP adjustments or FX conversions) can be applied to the baseline within the same dataset.

The risk of inconsistency applies also to assumptions. Therefore, RRP scenario modelling needs to rely on a single set of globally applicable assumptions that define the baseline. Local deviations (e.g., to quantify local LCR rules, consider local RWA uplifts or phase-in specificities) should be captured as explicit deviations to enable comparison with the global baseline.

Harmonising the definition of RRP phases or stages would further enhance consistency across RRP deliverables.

To mitigate the risk of inconsistent interpretations, RRP scenario modelling has to be based on the robust documentation of overlaps between the various deliverables and be subject to diligent review. This includes the descriptions and interpretations that are part of the deliverables.

3

Consistency

- Single dataset for a given financial dimension
- Baseline of data and assumptions with adjustments for deviations in local deliverables
- Common, harmonised definitions of all RRP phases
- Consistency between modelled recovery options and playbooks
- Robust documentation of overlaps between the various deliverables and diligent review
- Implemented consistency checks

4 **Granularity** ▸ RRP scenario modelling has to provide the required level of granularity for the data and the results in terms of the selection of the data fields needed for different deliverables.

The optimal level of granularity is a trade-off between accuracy and the availability of detailed information, on the one hand, and efficiency as well as a manageable complexity level, on the other hand.

The required level of granularity (i.e. the selection of data fields) is driven either by the direct requirements of the model to split the results along specific data fields or the indirect requirements to consider specific data fields to reach the targeted accuracy level.

Additionally, various triggers (e.g., for ELAC and ILAC or asset transferability restrictions) are often defined at either group level or standalone legal entity level. Therefore, RRP has to model the group based on bottom-up entity and branch data, complemented by a consolidation logic.

Both the direct and indirect granularity requirements are generally increasing. Essentially, this requires data mapping along multiple dimensions and, overall, leads to a significant volume of data. Considering the efficiency aspect, reaching the required level of granularity goes hand in hand with a certain degree of automation.

4

Granularity

- Coverage of:
  - Legal entities (including branch allocation) with group-consolidation capability
  - Jurisdiction/booking location
  - Division/business line
  - Split of third party vs. intra-company position (including trading partner for intra-company)
  - Transaction currency (including conversion to various reporting currencies)
  - GAAP code (e.g., IFRS and US-GAAP)
  - Contractual (remaining) maturity
  - Product group/product
  - Physical location of assets/asset encumbrance including trapped liquidity/hypothecation rights/pledge codes
  - Separation of global and local liquidity buffers
  - Supplementary collateralisation
  - Contractual (early) termination triggers
  - Time axis (daily time 'buckets')

5 **Comprehensivness** ▸ RRP scenario modelling has to provide comprehensive coverage of scenarios in terms of the ability to model all RRP-relevant types of crisis scenarios and provide outputs that meet the requirements of global and local recovery as well as resolution plans.

RRP scenario modelling must give comprehensive coverage of stress scenarios in which management identifies the potential (but unlikely) risk of a severe stress level beyond the severity of existing BAU stress testing. In some cases, regulators might require models to cover additional types of crisis scenarios.

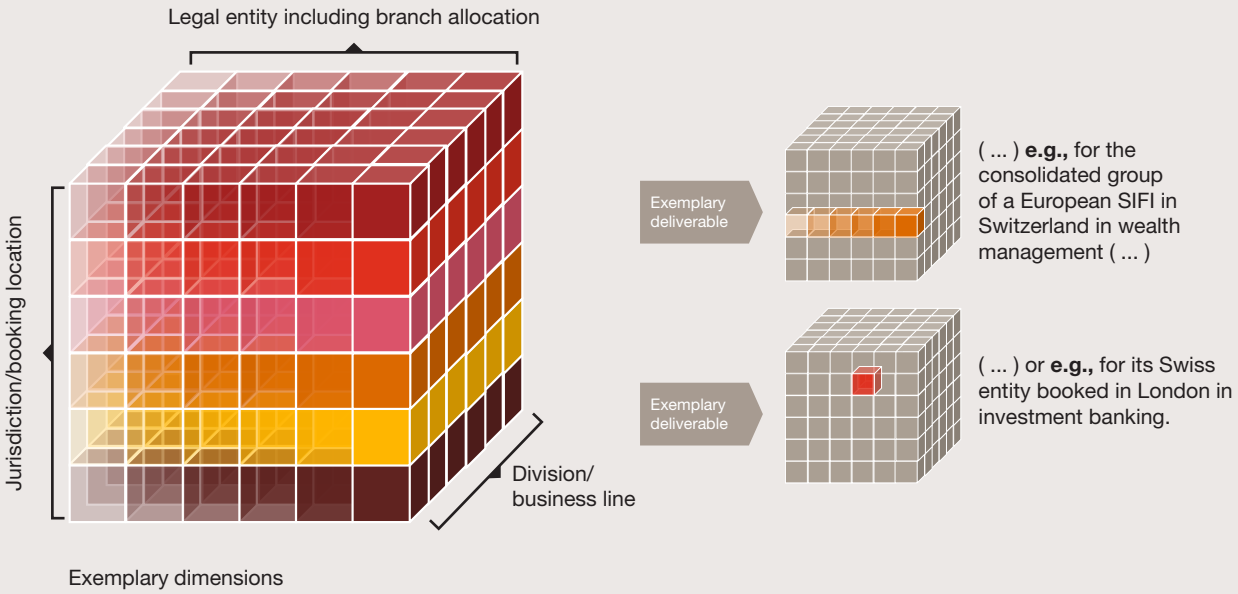
5

Comprehensiveness

- Coverage of any combination of the following crisis scenario aspects:
  - Slow burning vs. jump to default
  - Capital vs. illiquidity stress
  - Idiosyncratic vs. sector-wide vs. market-wide stress
  - Group-wide vs. individual entity stress
  - RRP strategy-specific (i.e., bail-in vs. solvent wind-down)
- Results for global and local deliverables as well as recovery and resolution plans

Granularity of data and results

The data basis of RRP scenario modelling must provide a **level of granularity** alongside **multiple dimensions** so that several deliverables can be addressed (...)

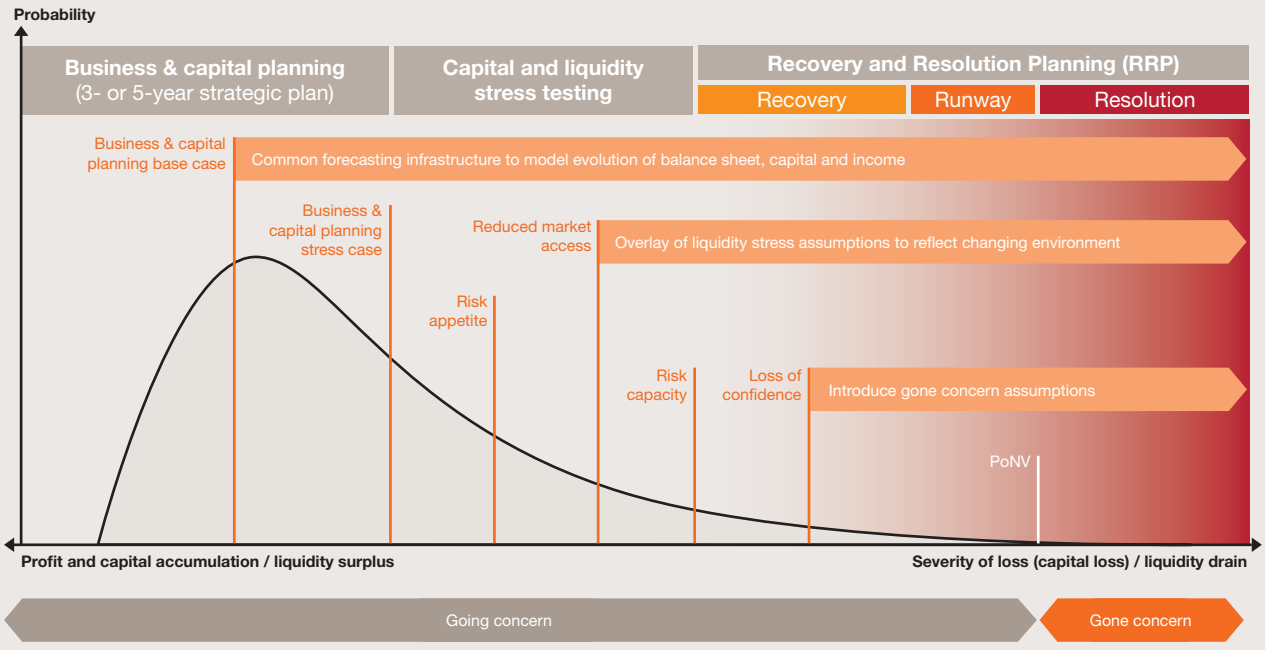


6 Adequacy ▸ RRP scenario modelling has to be based on adequate assumptions in relation to the specific circumstances (e.g., stress level or crisis type).

RRP crisis scenarios focus on extreme adverse events in the tail risk of a SIFI's exposure, which includes the modelling of both going-concern and gone-concern situations. Most SIFIs do not have their own or peers' historical data on the behaviour of clients, markets, regulators and management under such adverse circumstances. Historical data before or from the 2007/2008 financial crisis might not always be a good predictor of the future behaviour of the key stakeholders, who have learned some lessons in the meantime.

Therefore, we recommend that RRP scenario modelling rely on judgment-based assumptions to model the outer tail of stress severity. Contractual or other accounting data, where meaningful, might serve as a

Adequacy of assumptions



6

Adequacy

- Integration of RRP into BAU stress testing
- Integration of a severity scale in stress testing
- Mapping of all assumptions on the severity scale ranging from BAU to PoNV
- Adequate, judgment-based assumptions for the most severe stress events
- Consideration of behavioural assumptions deviating from contractual maturities
- Identical assumptions as BAU stress testing, where they overlap
- Overlay of RRP-specific assumptions

starting point. Such data are then adjusted by a set of judgment-based assumptions.

As the stress level of a severe crisis often increases step-wise, the initial stages of a resolution or liquidation scenario are comparable to a BAU stress scenario. Therefore, RRP scenario modelling should initially use identical assumptions as applied in BAU stress testing and then overlay RRP-specific assumptions as the severity level increases.

To achieve adequate assumptions, we recommend defining and integrating a severity scale for stress testing and mapping all assumptions against this severity scale. RRP scenario modelling starts by translating the narratives of a scenario to a severity scale. Consequently, RRP scenario modelling should work without RRP-specific top-side adjustments. Rather, it should integrate the required assumptions directly in the overall set of assumptions. RRP-specific assumptions must include all unique risks that BAU stress testing doesn't consider, such as the potential termination of financial contracts or a further increase in margin requirements.

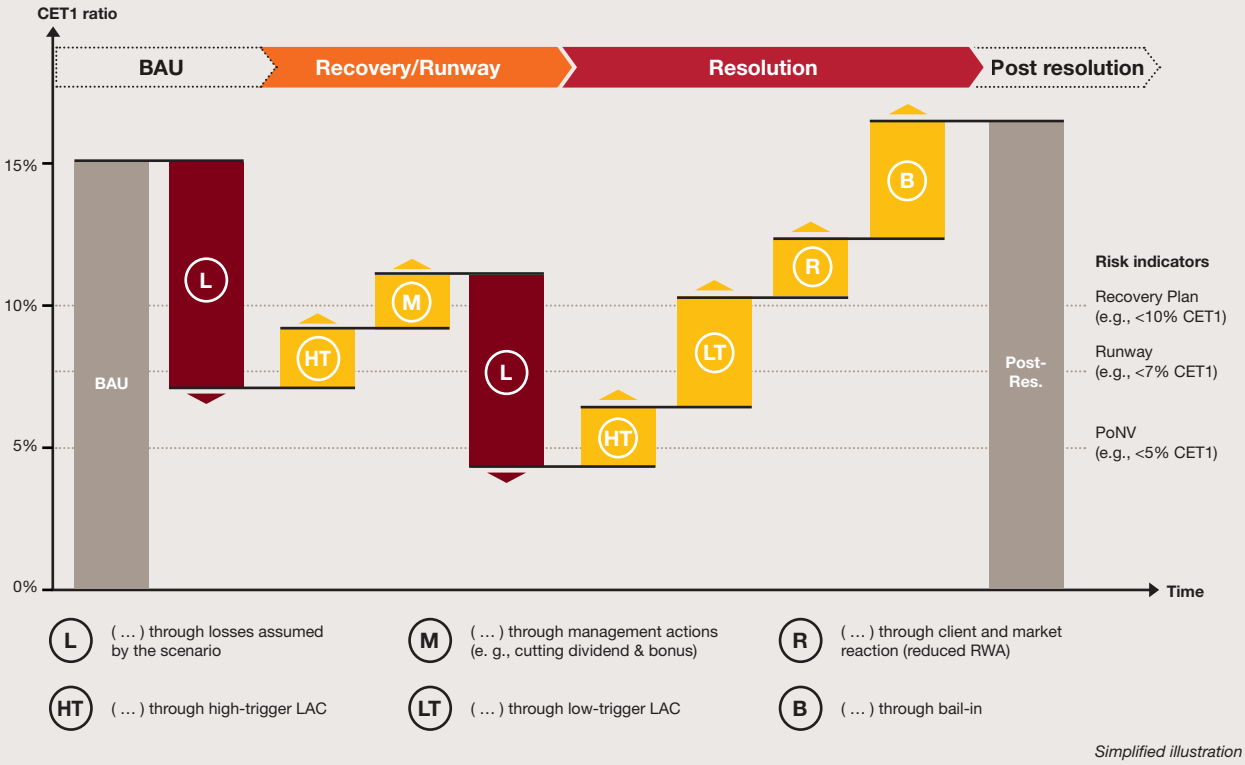
7 Clarity/usefulness ▸ RRP scenario modelling has to provide clear and useful results in the sense of easily understandable outcomes that are up-to-date and free from ambiguity presented in a concise and tailored manner to meet the objectives of RRP scenario modelling.

Especially during a severe crisis, RRP scenario modelling needs to provide and communicate clear and concise information. Management and regulators need to grasp quickly the model-generated reports, which should have sufficient detail to enable informed decision-making.

The model should provide a clear timeline of the crisis, depicting the events and the actions (presumably) taken at a given time to address both capital and liquidity aspects. One of a model's key objectives is to assist management in deciding on the best recovery options in a crisis. Therefore, it has to be

Clarity/usefulness

Clear and useful RRP scenario modelling **informs management and regulators** about the sequential development of key financial dimensions in a crisis and how **e.g., capital ratios** will change at a determined stage (…)



Simplified illustration

able to reduce the complexity of an action's implications and demonstrate the impact of recovery options to allow for 'trial-and-error'.

Further, the model needs to provide timely results, i.e., at the required frequency and within an acceptable lead-time. The ability to use RRP scenario modelling to provide management and regulators with an informed decision basis during a crisis leads to tight requirements with regard to model refreshes.

Besides surviving an immediate stress situation, there is an increasing focus on assessing the ability to return to stable financials over time. Therefore, a modelling of the timeline beyond PoNV is needed.

Especially in resolution, showing the relative sequence of events requires commonly defined, daily time 'buckets' to facilitate a detailed understanding, for instance of the effects of a bail-in cascade.

A significant contribution to clarity and usefulness is to take a reverse view, i.e., to start with certain thresholds for financial dimensions and define the scenario loss as a variable. Reverse stress testing helps identify the range of absorption capacities for various financial dimensions in order to determine improvement opportunities, such as potentially unused management actions.

Clarity is increased further by understanding the sensitivity of model outputs to the underlying assumptions.

7

Clarity/usefulness

- Condensed overview as an executive summary
- Appropriate balance between data, analysis, interpretation, qualitative explanations, visualisations of results and recommendations
- A model refresh
  - Can be performed on any day of the year
  - Is feasible within less than 24 hours run-time
  - Requires less than 24 hours lead-time
  - Considers data with a minimal time lag
- Full path after a crisis to reach stable financials
- Drill-down into specific topics
- Familiarity of management and regulators with the model reports
- Reverse stress view (liquidity and capital)
- Sensitivity analysis of assumptions

Meaningful visualisations or statistics of the model's results should be provided, too, as they enhance significantly the usefulness of the outcomes.

8 Transparency ▸ RRP scenario modelling has to provide the required level of transparency on the modelling process in terms of results that have a 'clean' audit trail to trusted information as well as a rationale for the methodology applied to transform the inputs.

Transparency

- Thorough model documentation
- High-level overview of the overall modelling process
- Central set of baseline assumptions and any deviations from them
- Reference to trusted data points (e.g., to the annual report)

8

While the model's mechanics and methodology might be evident to the design and operating team, other parties are required to understand not only the results but also the modelling approach and methodology. There is a growing demand from regulators to validate and benchmark such models against the regulators' own guidelines and principles as well as market practice. Moreover, management should have sound knowledge of the model, as transparency on a model's working is a strong enabler of management's acceptance and trust of a solution.

Thorough documentation, including a centrally maintained set of baseline assumptions, contributes to creating transparency. The baseline assumptions are used to model a consistent group-wide view as well as to define any deviations for local deliverables. For review purposes, especially, consistent reference points to known parameters (e.g., to the annual report) can ease understanding. Sanity checks with internal stakeholders from different backgrounds who are not directly involved in the modelling process can help to overcome 'professional blindness' and spot any weaknesses.

9 Adaptability/flexibility ▸ RRP scenario modelling has to be adaptable and flexible in terms of the ability to reflect changes in circumstances that were still unclear when originally designing and building the model.

- A broad range of root causes might lead to adaptations to the model (taking into account the restrictions on time, complexity and efficiency):
- Changes in regulatory requirements;

- Changes in a group's legal entity structure;
- Changes in the key assumptions of the model.

Ensuring the adaptability of RRP scenario modelling creates requirements concerning the set-up and documentation of the model. We recommend, therefore, a modular approach that clearly defines and segregates components and interfaces. Typically, the various components include the actuals, direct and indirect stress impacts, recovery actions, ELAC and ILAC conversions and intra-group transfers of liquidity or capital.

A modular set-up can even deal with the differing levels of granularity and complexity of local regulatory requirements. This is an attractive option as opposed to simply applying the most complex regulatory requirements across an entire group.

9

Adaptability/flexibility

- Modular approach with clearly scoped components and interfaces
- Ability to apply challenging regulatory requirements on a local scope only

10 **Efficiency** ▸ RRP scenario modelling has to ensure efficiency in terms of minimising the resource inputs needed to produce the required outputs.

While the previous design principles outlined above have been deduced in order to address the demands of effective RRP scenario modelling (i.e., the ability to meet the requirements), efficiency must not be lost from sight. This is especially true as the number of required deliverables is growing.

When developing or expanding a model, the basis should be constructed in such a way as to minimise the effort and costs of maintaining the model and producing the deliverables. Firms face the triple challenge of continuously delivering RRP inputs while simultaneously expanding and enhancing their model's capabilities under the applicable resource constraints.

To facilitate the capture of as many synergies as possible within the extensive scope of RRP, the model should be integrated as far as possible into BAU applications. In the long term, building a separate tool for RRP would mean substantial additional effort in terms of maintaining the model, mitigating the risk of inconsistencies and the need to reacquire the trust of senior management and other stakeholders.

As part of the integration of RRP into BAU applications, a high degree of automation is needed to keep costs low. Such automation could include, for example, leveraging feeds from source systems, the automatic aggregation of results and reports, or a dynamic dashboard to visualise the results.

Efficiency

- High degree of automation
- Integration of RRP scenarios into BAU stress testing and BAU models
- Adequate handling of large amounts of data (i.e., no spreadsheet solution)
- Manual changes only where appropriate

10

About PwC's RRP Centre of Excellence in Zurich, Switzerland

PwC's RRP Centre of Excellence

The RRP Centre of Excellence is PwC's response to one of the most complex, comprehensive and costly challenges that large institutions have faced since the financial crisis.

PwC's RRP Centre of Excellence is a specialised team based in Zurich, Switzerland. Since 2011, it has provided an interdisciplinary service offering in all areas of recovery and resolution planning, including bank restructuring. The team takes a holistic view to encompass the financial, legal, operational and IT aspects of RRP.

The team operates out of a country that has spearheaded the regulatory developments relating to TBTF since the 2007/2008 financial crisis. Positioned in the centre of Europe and home to banks whose assets are four times the country's gross domestic product, RRP is uniquely relevant for Switzerland.

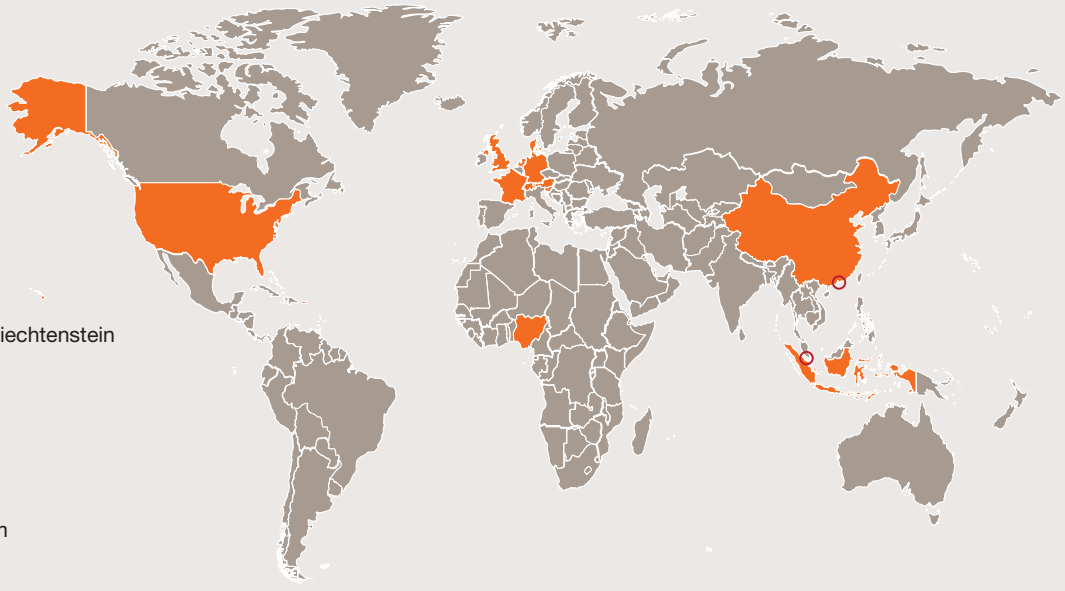
Supporting you in RRP scenario modelling

While our services encompass the full suite of RRP, the team focusses specifically on RRP scenario modelling. We have supported clients in:

- Defining the design principles and cornerstones of RRP scenario modelling as a 'sparring partner';
- Developing conceptual designs for RRP scenario modelling;
- Setting up RRP scenario modelling in close collaboration with the relevant functions (e.g., Finance, Treasury, Risk, Legal and the business side);
- Reviewing and challenging RRP scenario modelling; and
- Auditing RRP scenario modelling on behalf of a regulator.

Global footprint of the Zurich RRP Centre of Excellence

- Switzerland
- Austria
- China
- Denmark
- France
- Germany
- Hong Kong
- Indonesia
- Principality of Liechtenstein
- Netherlands
- Nigeria
- Singapore
- Slovenia
- United Kingdom
- United States



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