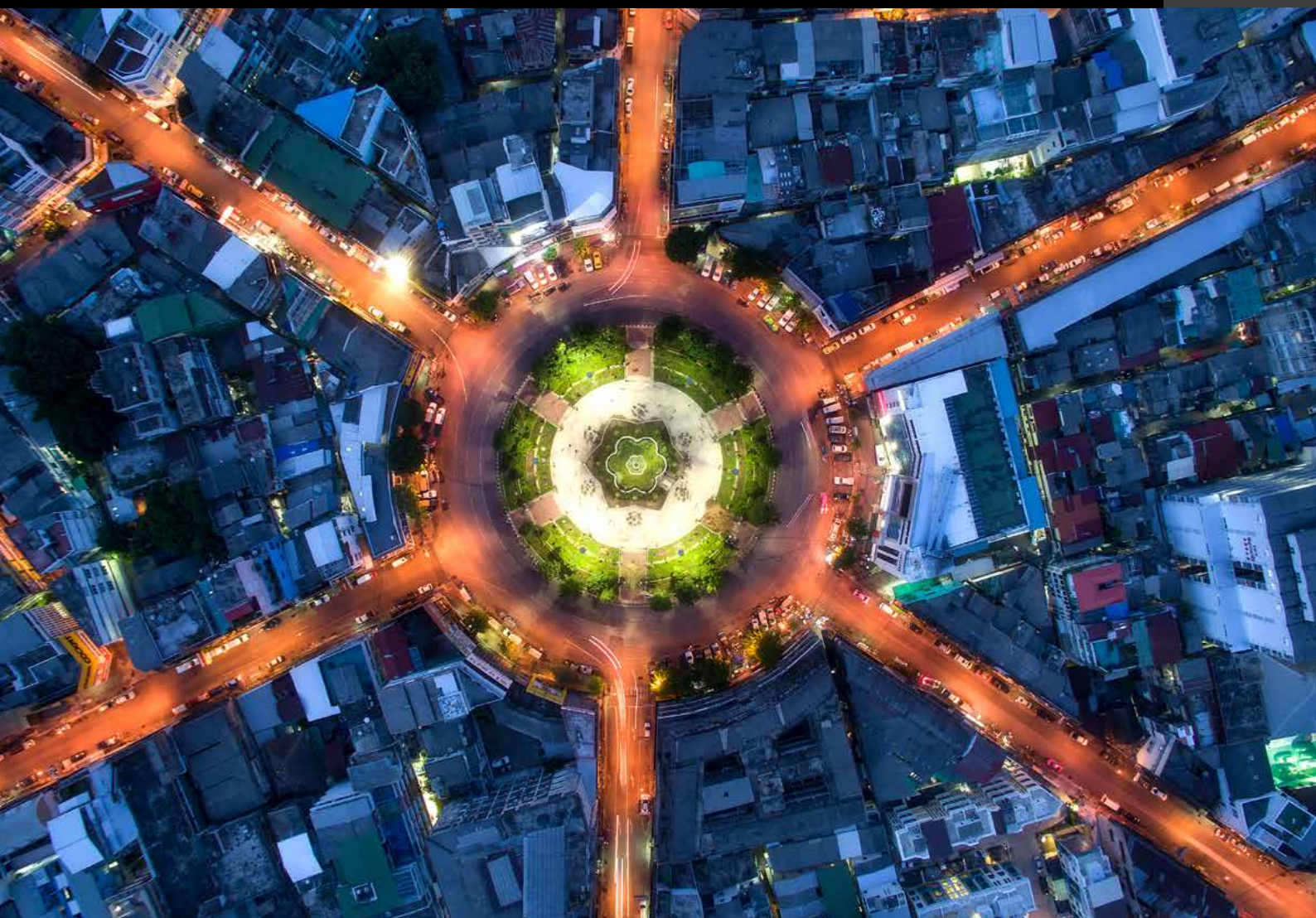


Pandemic Analysis and Scenario Simulation

Our tool for detailed simulation of the impact of COVID-19 on capital ratios



Understanding and simulating the impact of COVID-19 on capital ratios

Overview of the functionalities

Our Pandemic Analysis and Scenario Simulation tool is an 'R'-based scenario simulation tool that supports banks with all the challenges involved in the simulation of the impact of the COVID-19 pandemic on regulatory capital ratios, in particular those relating to credit risk. This tool combines many years of experience in the calculation and simulation of credit risk RWA according to current and future regulatory requirements, such as Basel IV and NPL backstop. It is

compatible with most common regulatory reporting software products and is highly flexible in its parametrisation and definition of stress scenarios. Generally, all calculations will be done on the most granular level. However, they can also be run on an aggregated portfolio level if needed. Results are provided on a granular level with a set of predefined reports and can be analysed using BI-tools, allowing for an individual and detailed impact analysis.

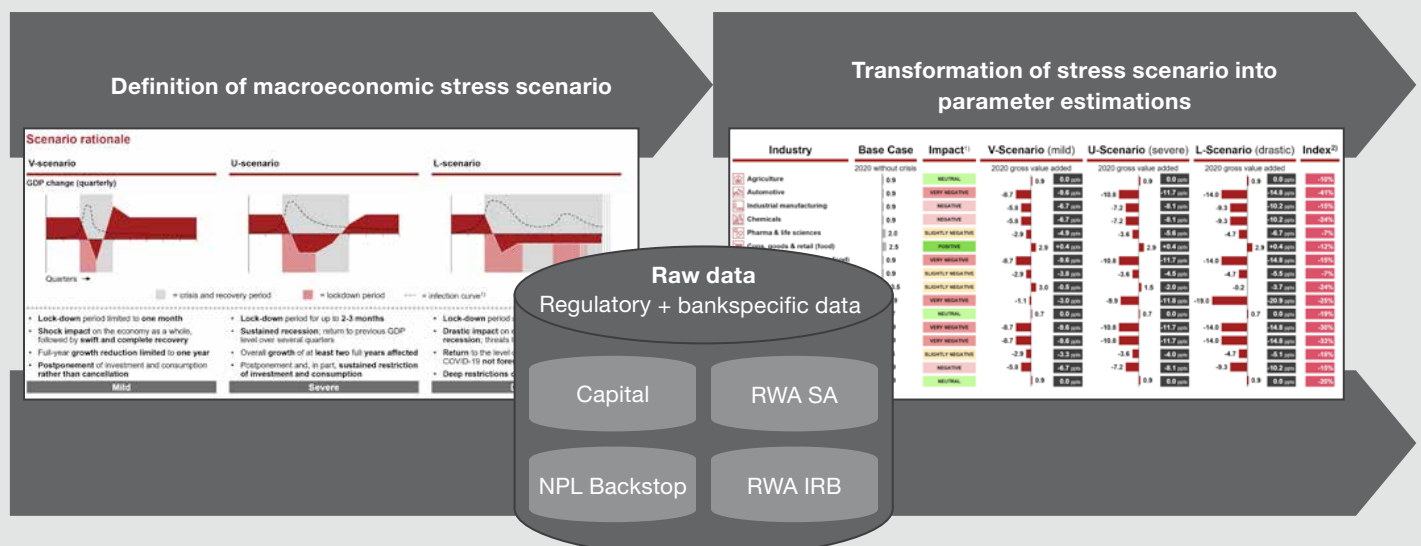
The simulation tool uses a standardised three-step approach that can be individually adapted to the particular needs of our clients at any time.

In the first step, the underlying macroeconomic scenarios are defined. This tool can process a bank's own scenarios and ones provided by us.

Step 1: data input

In this step the scenarios will be translated into risk parameters. Here, the tool also has the flexibility to process estimations that have already been produced by the bank or other external sources, or to use estimations provided by us.

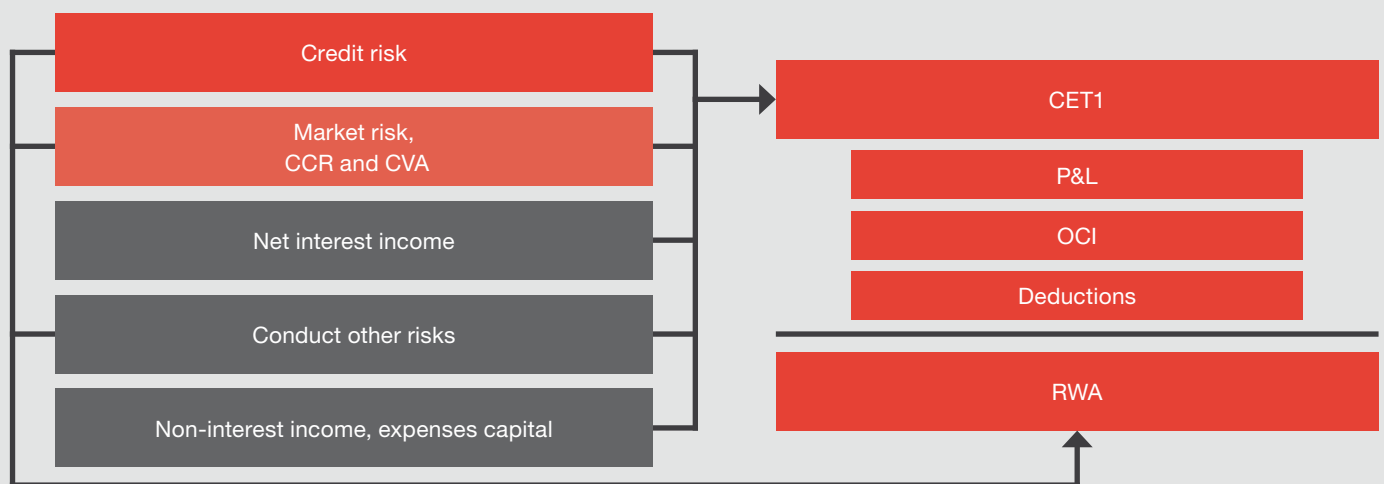
The simulation is based on granular data from banks.
We support data input in various formats.



Step 2: simulation

The second step is the core functionality. Based on the macroeconomic assumptions and adjusted risk parameters, this tool calculates the impact of the COVID-19 crisis on regulatory capital ratios. The focus is on the most relevant risk category credit risk. A standardised approach or an IRB approach can be used over a three-year horizon. The simulation also covers the impact which changes in risk provision (IFRS 9 or nGAAP), P&L effects and OCI effects could have on capital.

The simulation of net interest income, non-interest income and operational risk are optional and can be easily incorporated via parameter tables.



Step 3: analysis

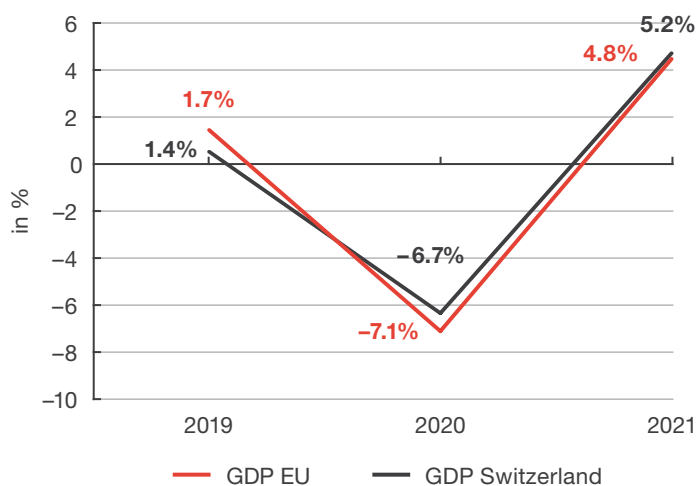
In the last step, our simulation tool offers a wide range of predefined reports that visualise the impact. All input data and simulation results are available on a granular level. Many additional reports can be generated using BI-tools or with the support of our experts.



Step 1: input – multiple data sources for the simulation of regulatory capital ratios

Based on current estimations, the real economy in the Switzerland is expected to contract by up to –6.7% in 2020 (GDP, baseline). The impact on bank capital ratios is, inter alia, a function of the respective industry sector and country exposure, as well as the bank's business model.

GDP – adjusted for COVID impact



Sources: SECO, IMF, PwC.

Our simulations in EU zone indicate a CET1 ratio impact of 250bps (moderate) to 950 bps (worst case) based on our macro-economic COVID-19 stress scenarios.

The tool's strong scenario calculation engine simulates the impact from COVID-19 based on several data sources. We can support banks with our strong technical and IT knowledge to modify and harmonise all the relevant data for the simulation. There are three main data sources that are used to simulate the impact of COVID-19.

- 1 Banks' granular data on RWA and regulatory capital**
- 2 Macroeconomic scenarios and derived risk parameters**
- 3 Individual parameter data or portfolio adjustments**

1

Banks' granular data on RWA and regulatory capital

The basis for the simulation is the banks own data from the regulatory reporting systems. The data interface of our tool is compatible with all common regulatory reporting software. This way, the initial effort of extracting the data from internal systems can be minimised. Nevertheless, the tool has the flexibility easily to process alternative data sources or additional data sources from risk management, accounting or treasury.

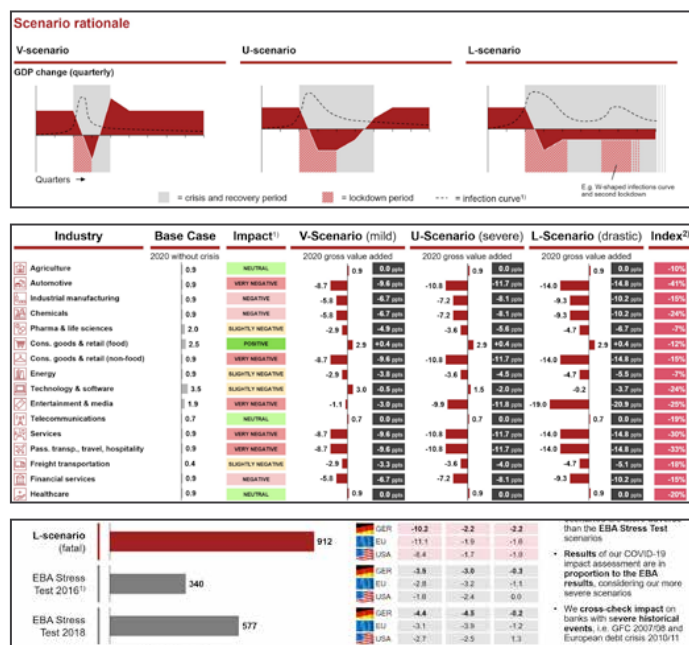
Annex 1 - REPORTING ON OWN FUNDS AND OWN FUNDS REQUIREMENTS			
Reporting period	Reporting entity	Reporting period	Reporting entity
2019	1	2020	1
2019	2	2020	2
2019	3	2020	3
2019	4	2020	4
2019	5	2020	5
2019	6	2020	6
2019	7	2020	7
2019	8	2020	8
2019	9	2020	9
2019	10	2020	10
2019	11	2020	11
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2019	96	2020	96
2019	97	2020	97
2019	98	2020	98
2019	99	2020	99
2019	100	2020	100

2

Macroeconomic scenarios and derived risk parameters

For an adequate simulation, it is crucial to set up appropriate macroeconomic scenarios and translate them into stressed risk parameters. Here again, the tool's impressive flexibility comes to the fore: it can process data from the bank's own macroeconomic forecasts or our forecasts. We have many years' experience in the estimation of stressed risk parameters and cooperates with external partners to be able to provide reasonable data for more exotic portfolios too.

If already existing at the bank, risk parameters such as external ratings, PDs, LGDs, EADs, EL, collateral values, risk provisions and deduction positions can be directly uploaded into the tool.

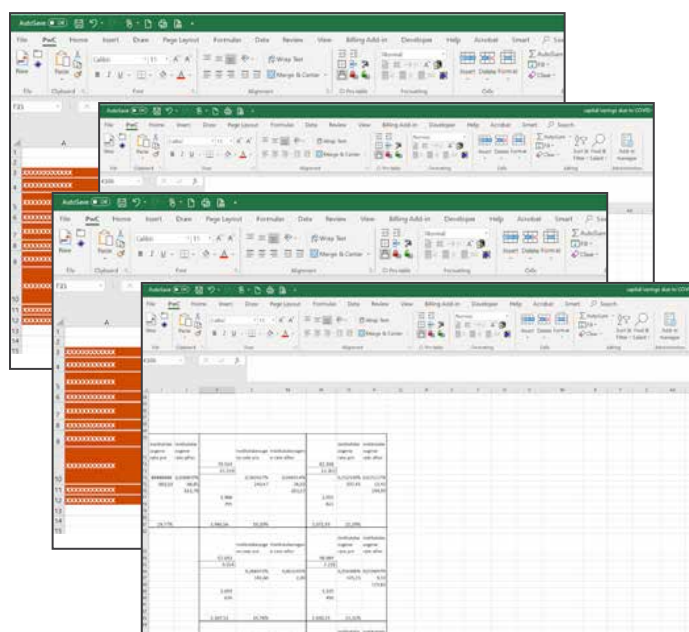


3

Individual parameter data or portfolio adjustments

The simulation of the impact of the COVID-19 crisis is not an everyday task. Therefore, it might be necessary to enrich the granular input data with additional information or process corrections.

Depending on the RWA approaches used and internal models, this tool has the flexibility to include multiple parameter tables to adjust almost all input parameters and use benchmark parameters or expert judgements. A detailed simulation of nGAAP and IFRS 9 risk provisions can be incorporated using separate our tools or based on bank simulations.



Step 2: sophisticated calculation engine allows our tool to simulate COVID-19's impact on all regulatory ratios

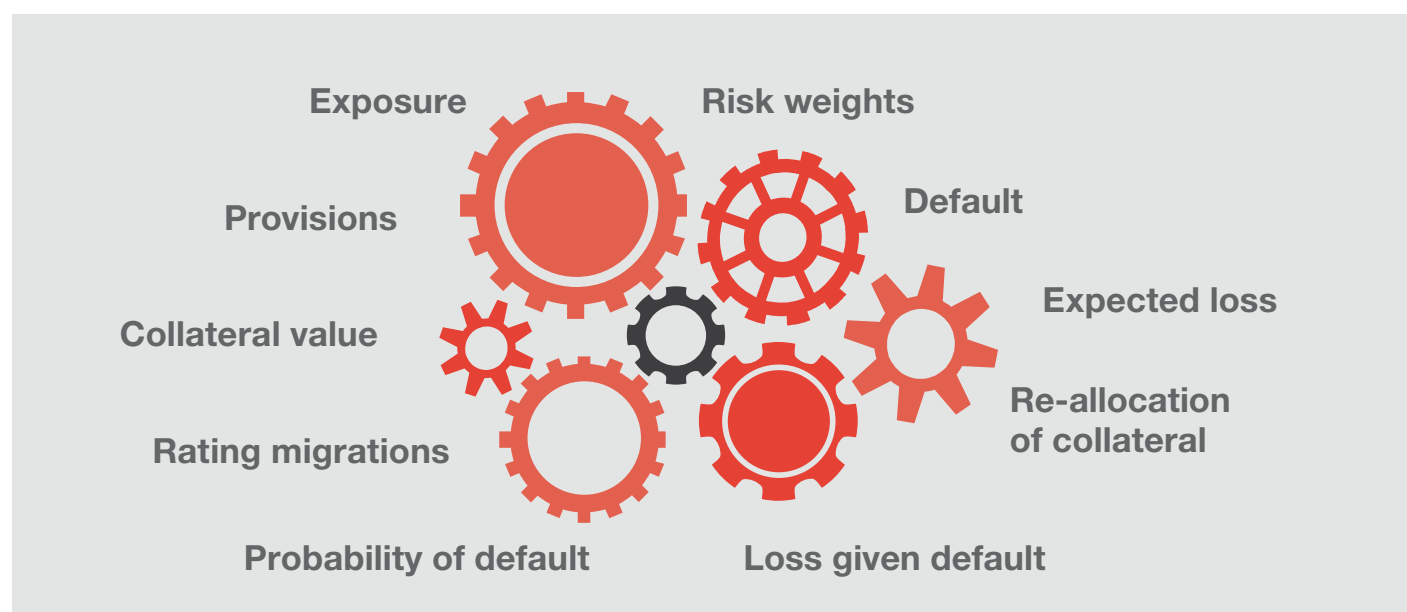
The Pandemic Analysis and Scenario Simulation tool uses granular data existing in banks' finance and risk departments to calculate the impact of COVID-19 on exposure level, taking into account all relevant regulatory ratios. The tool simulates the aggregated impact for the years 2020 to 2022. Individual time horizons, e.g., quarterly simulations, are possible as well.

It simulates the impact of COVID-19 on regulatory own funds, taking into account the impact of increased provisions (p&l), fair value changes (p&l, OCI) and nGAAP specific elements (e.g., §340f HGB). The non-performing exposure backstop is also recalculated as it will be heavily influenced by additional defaults:

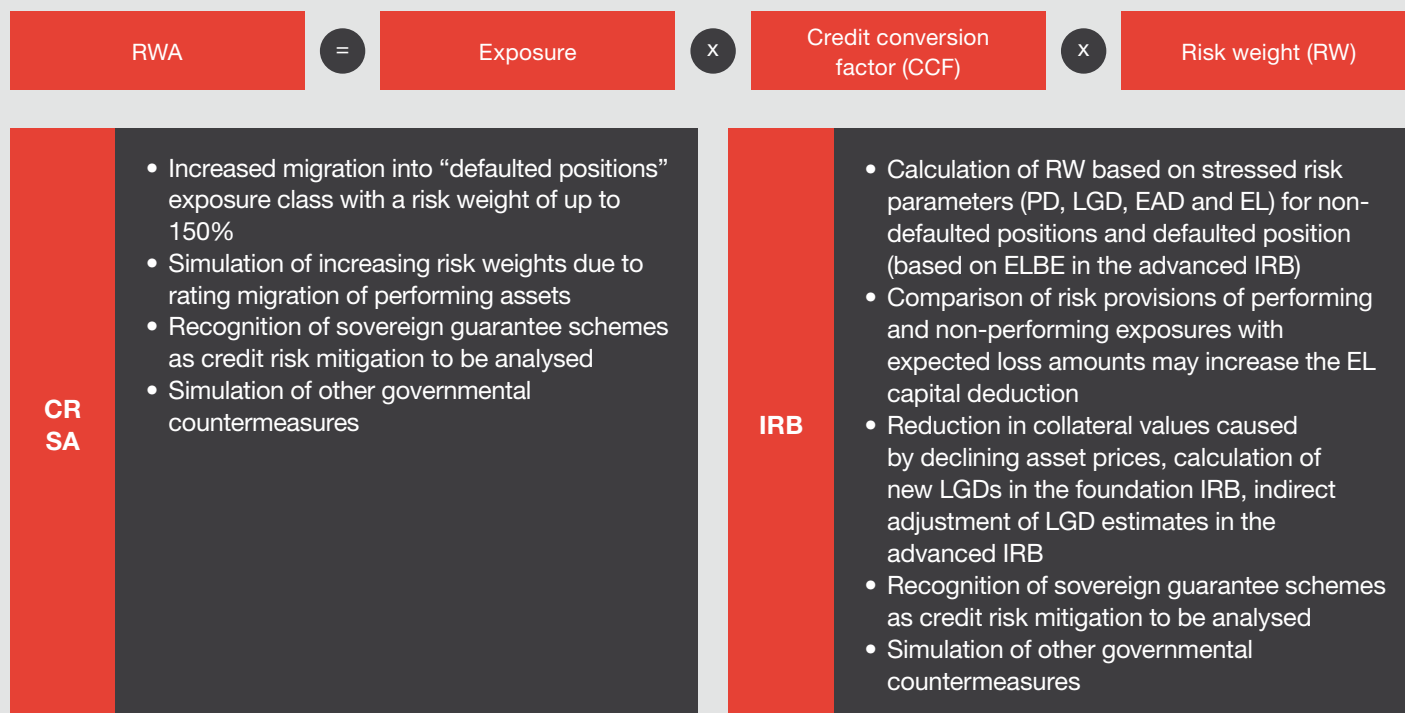
Own funds

Type of collateral	Possible COVID-19 impact	Key features
Uncollateralised	<ul style="list-style-type: none">Increased default rates will increase the NPE capital deduction	<ul style="list-style-type: none">Simulation of the impact of the NPE backstopAnalysis of sovereign guarantee programmes in different countries
Immovable property	<ul style="list-style-type: none">Decreasing collateral values increases the uncollateralised parts of exposures	
Movable property	<ul style="list-style-type: none">Decreasing collateral values increases the uncollateralised parts of exposures	
Other financial and non-financial collateral	<ul style="list-style-type: none">Increasing importance due to sovereign guarantee programmes	

The tool focusses on own funds and credit risk in the banking book, covering both the standardised and the internal ratings based (IRB) approach. Based on single exposure data, the tool is able to simulate multiple parameters impacting credit risk RWA:



Credit risk RWA

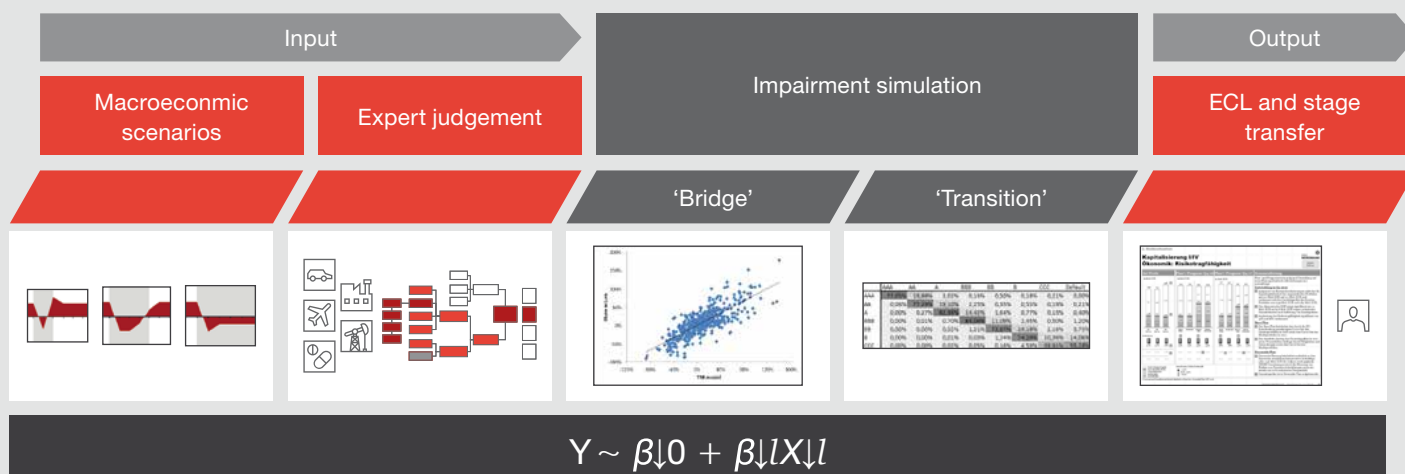


Input from external sources or our other tools

The tool's flexible simulation engine and the granular data can be combined with other tools and external sources as well. For example, our additional tools can be used and the results integrated into the simulation and analysis.

One such tool is the Credit Risk Impairment Stimulation Platform, which is used for the calculation of risk provisions:

Our Credit Risk Impairment Simulation Platform



The most important driver of COVID-19's impact will be additional defaults, stage migrations and impairments. In addition to an integrated capability to calculate these parameters, our Pandemic Analysis and Scenario Simulation tool also allows users to input the results of

their own ECL calculation or use dedicated tools such as the Credit Risk Impairment Simulation Platform tool to calculate provisions based on COVID-19 stressed risk parameters.

Integrating Basel IV test calculations into COVID-19 simulations in EU zone

Basel IV test calculations were always based on the benign economic circumstances before COVID-19.

The strong increase in risk weights caused by Basel IV will be additionally magnified if combined with the macroeconomic downturn caused by COVID-19.

Impact on average risk weighted assets

23.6%

All banks

Impact on aggregated capital shortfall

24.1%

Large banks

€ 124.8 Mrd.

All banks

€ 123.8 Mrd.

Large banks

Other key ratios impacted by COVID-19

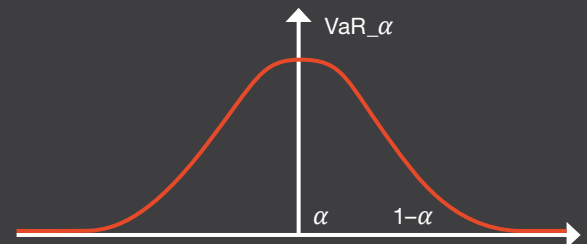
Even though not covered by our simulation tool, it is important for banks also to take into account the following impacts of COVID-19 on other regulatory requirements:

Market risk (SA)

- Decreasing market values
- Increased volatility does not impact regulatory risk weights

Market Risk (IMA)

- Increased volatility will impact VaR
- Q1/2020 might serve as basis for stressed VaR in the future



LCR

- Breach of minimum requirement possible but ...
- Ad hoc
 - reporting to supervisor
 - daily reporting
 - plan to reinstate compliance

NSFR + AE

- COVID-19 will increase funding costs, making collateralised funding more attractive, increasing asset encumbrance levels

Leverage ratio (LR)

$$LR = \frac{\text{Tier 1 – Capital}}{\text{Total exposure measure}} \geq 3.0\%$$

- Increased credit losses impact the leverage ratio
- Sovereign guarantees not eligible as a countermeasure

Large exposures

- COVID-19 impact on real economy make careful monitoring of LE limits necessary
- Also applies to indirect exposures resulting from collateral and guarantees

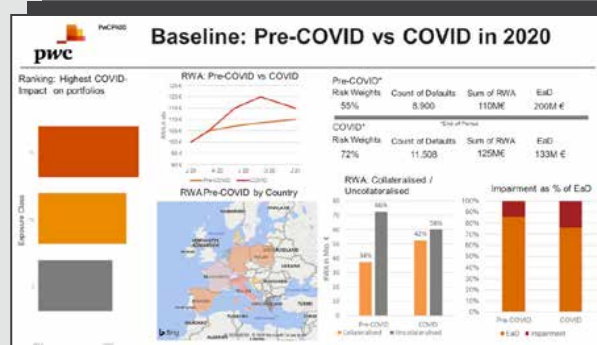
Step 3: granular data combined with a flexible simulation engine provides you with the right level of analysis

Combining exposure level data with state-of-the-art data analytics ensures great flexibility in tailoring the output to the level of granularity required – from insights to a deep dive and everything in between. This allows for detailed analysis of the simulation results while at the same time ensuring that management decisions are supported by high level data:

Boardroom-ready dashboards

This simulation tool uses modern BI technology to create dashboards that give you all the information that you need at first glance – and the possibility to drill-down even further.

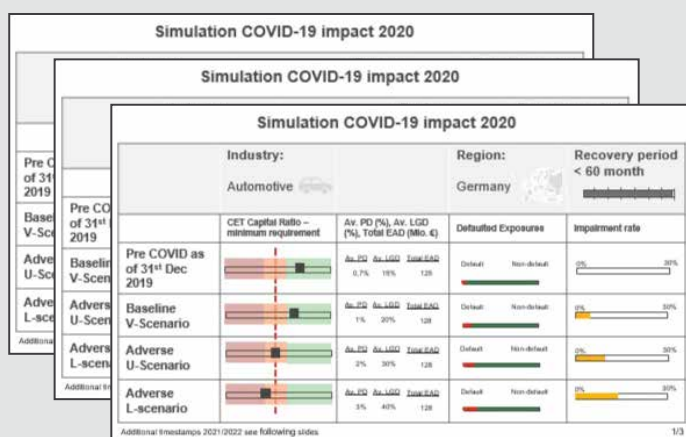
Additional breakdowns by line of business, product type, customer group or geography can be added and adjusted as required.



Reports on portfolio and client level

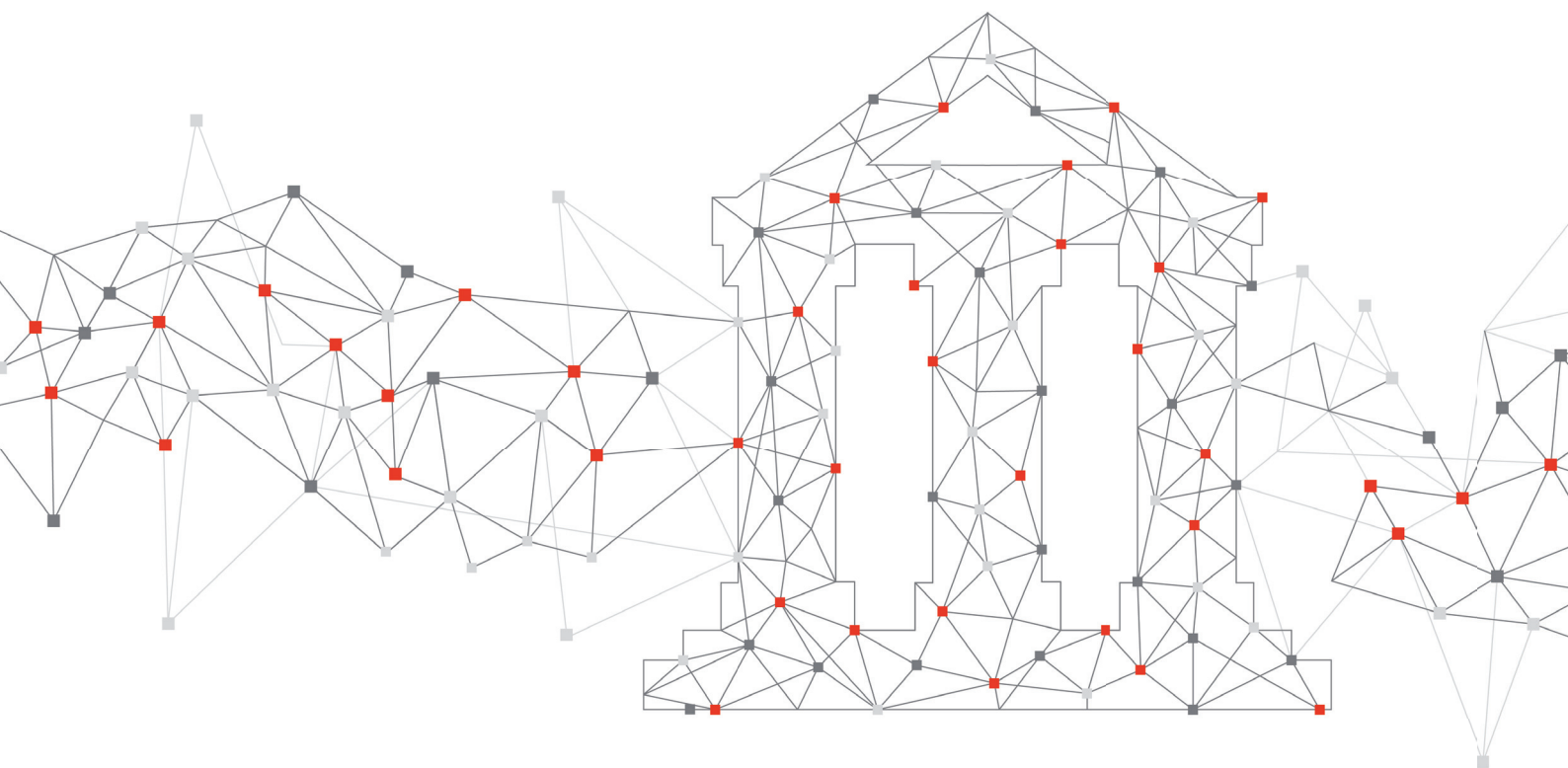
The results can be analysed on total bank or individual portfolio or customer level. No matter if the results will be discussed on board level or with customer relationship managers, our tool can provide you with the needed information. For example, it can create score cards on portfolio, sub-portfolio, region or customer level.

Portfolio level and client impact at a glance – the score cards give a quick overview on the expected impact on key portfolios or clients. This is useful for market units as well as risk management to adjust business and to derive potential capital planning and management adjustments.



Examples for KPI used for Portfolio level score cards:

- CET1 Capital Ratio per scenario: consumption compared to minimum requirement
- Average PD, Average LGD, Total EAD per scenario: Values in % (PD, LGD) and EAD
- Defaulted exposure per scenario: share of defaulted EAD
- Impairment rate per scenario: impairment rate as a% of EAD

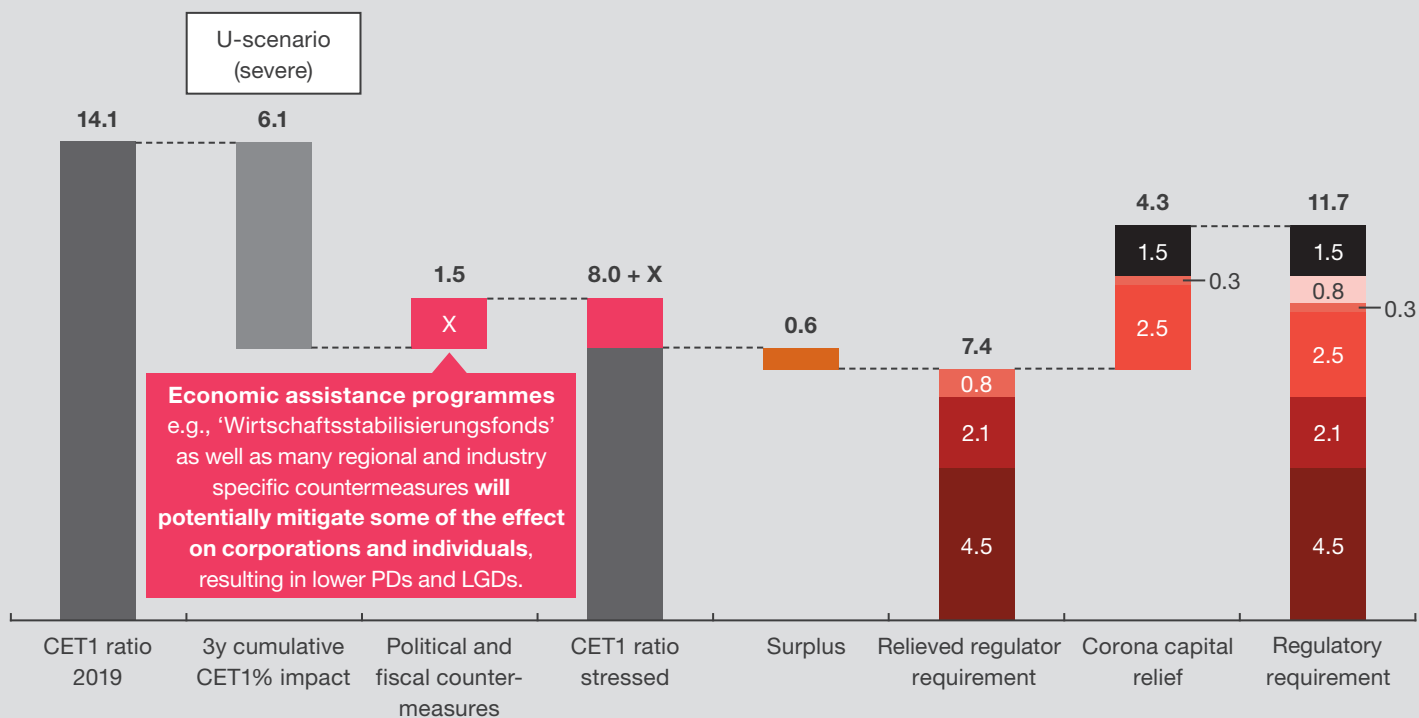


Graphical analysis of CET 1-ratio changes

To fully understand the impact of the COVID-19 crisis on regulatory capital, it is necessary to break the effects down to its root causes. The tool can generate reports that explain step by step the changes to the capital ratios due to the macroeconomic downturn, political and fiscal counter-measures, adjustments in the prudential framework or the possible use of capital buffers.

Next to a predefined set of standardised reports and dashboards, client specific additional dashboards can easily be added.

CET1 key driver analysis – aggregated view – U-scenario (2/3)



Providing you with guidance through uncertain times

Even after several weeks of lockdown, there is great uncertainty surrounding the severity and duration of COVID-19's impact. To steer you through these highly

uncertain times, our tool provides you with all the information you need.



Going concern ensured

- Transparency about COVID-19's expected impact on key indicators such as provisions, risk-weighted assets, P&L and capital
- Instant updates based on existing risk and finance data as well as the latest macroeconomic predictions from external or internal sources
- Granular data base allows breakdowns necessary for management
- Takes into account support measures such as memorandums and guarantee schemes, as well as bank-specific management actions



Regulatory compliance ensured

- Ensure compliance with capital requirements during a macroeconomic downturn caused by COVID-19
- Ensure requirements for capital planning and stress testing are fulfilled
- Communicate with internal and external stakeholders, such as supervisors, rating agencies and investors, using a reliable data base
- Demonstrate the use of benchmark values in portfolio simulations



Capital management ensured

- Identify vulnerabilities by country, sector, counterparty, line of business, product type, etc.
- Take the right measures and simulate their impact using all available data rather than relying on simplifications
- Management decisions on portfolio measures (buy/hold/sell) are supported by detailed information on the likely impact under COVID-19 circumstances

Our expertise to help you manage the impact of the COVID-19 crisis

The Pandemic Analysis and Scenario Simulation tool can support you in analysing and managing the impact of the COVID-19 pandemic. In addition, an experienced team of experts and our entire network is at your disposal. The current circumstances are new and unexplored for banks and regulators. We offer you a team with extensive experience in economic and financial crisis situations and their management. This enables us to provide efficient support in implementing suitable and sustainable solutions.

About us

Our clients face diverse challenges, strive to put new ideas into practice and seek expert advice. They turn to us for comprehensive support and practical solutions that deliver maximum value. Whether for a global player, a family business or a public institution, we leverage all of our assets: experience, industry knowledge, high standards of quality, commitment to innovation and the resources of our expert network in 157 countries. Building a trusting and cooperative relationship with our clients is particularly important to us – the better we know and understand our clients' needs, the more effectively we can support them.

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