

d-fine



COVID-19 scenario analysis

An unexpected stress test in 2020

COVID-19 scenario analyses require immediate attention

Stress tests are the established tool for analysing the impact of exceptional events on balance sheets, business models and fundamental viability of a financial institution. The current situation is exceptional in many respects: It includes restrictions to social and economic life. As of yet, common stress-testing scenarios do not consider this particular kind of economic emergency restriction.

Furthermore, common scenarios also do not take into account the medical roots of the current crisis. For example, unless a vaccine or an effective drug becomes available in a timely manner, the duration of economic emergency restrictions is dependent on the fraction of the population that is infected [1]. As such, this dictates the timeline for economic recovery. In this context, it is interesting to note that in March 92.3% of all tests performed in Germany were negative [2], indicating that it might take longer than expected for countries to gain large scale immunity.

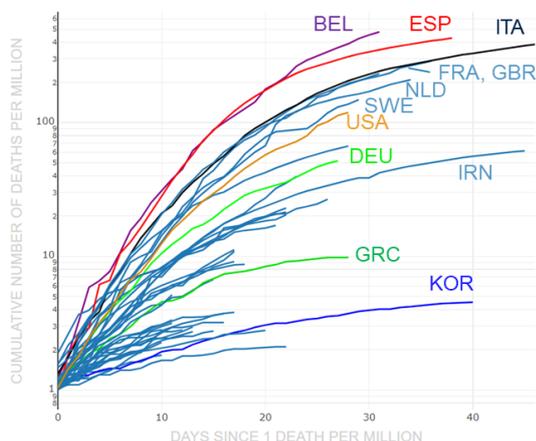


Figure 1: Evolution of COVID-19 related deaths on a logarithmic scale in different countries with a population of more than 10 million (Source: ECDC, 19 April 2020)

There are a multitude of varying predictions with regards duration and severity of the current situation. In any case, its immediate effect as well as the subsequent aftermath will have a substantial individual, social and economic impact. Consumer spending and investment behaviour as well as business activity of financial institutions will be directly affected. The immediate impacts and ripple effects require urgent attention and can be analysed in the context of stress tests.

Now is the time to decide on which path to take, going forward. Such decisions should be based on ad-hoc stress tests and corresponding analyses. At the same time, management, regulators and auditors require deliberation of the current situation including likely scenarios for future developments, as well as the impact on a given financial institution. For example, in an upcoming quarterly report.

d-fine COVID-19 scenarios: a foundation for internal analyses

d-fine is developing macroeconomic scenarios about the COVID-19 pandemic focused on its impact on financial services. Three scenario paths of light, intermediate and severe are used to model the possible spectrum of political and societal decisions. Main risk factors are the duration of the economic shutdown and the question to what extent a crisis in the real economy affects the balance sheets of financial institutions. Therefore, we recommend an analysis hinged on a multi-year horizon, using synergies with internal stress testing methods from ICAAP and capital planning. Using our stress-testing tool, we are able to implement and evaluate such scenarios with you at short notice.

Analyses, publications and statements of expert groups, renowned think tanks, market participants and public agencies form the basis for development of our scenario narratives. We transparently develop macroeconomic scenario paths and justify their shapes. In the current situation, ability to parameterise is the key in obtaining tailored scenarios.

The main step in implementing a stress test from a macroeconomic scenario is the projection of the impacts onto individual risk types. We expect substantial effects for credit and market risk, for example, due to widening credit spreads. Concerning derivation and granularity of shock specifications, we follow regulatory stress tests. In particular, the EBA methodology and LSI stress tests. This allows for easy integration of the d-fine COVID-19 scenarios into existing methods and processes.

We use inverse stress tests, where the duration or effectiveness of political or societal measures can be parameterised, to answer the question of how long a given institution can withstand the current situation.

COVID-19 scenarios are not comparable with the financial crisis

The narrative design takes into account the particular nature of the current crisis: In contrast to the financial crisis, it did not originate in the financial sector but rather consequentially compromises financial institutions:

- The current crisis is primarily a pandemic. Therefore, the development of stress scenarios must be based on assumptions about its progression and duration. Direct economic consequences result from supply and demand shocks as well as infection rates and deaths.

- Political measures to contain or slowdown the pandemic are even more important for the economic evolution than the medical progression of the pandemic. This applies for example to duration and intensity of the shutdown and to measures such as border closures.
- Additional factors are the nature and effectiveness of economic support and of stimulus measures. If the pandemic takes a more severe course, it is plausible that additional steps are implemented on top of the already agreed measures, or that such measures are abandoned. These measures have the potential to, for example, partially soften supply and demand shocks, avoid credit defaults and to influence interest rates.
- Political reactions and measures to fight the pandemic represent exceptional burdens for state budgets that might lead to similar consequences as seen during the sovereign debt crisis. On top of this, the resulting increased money supply compounded by reduced economic activity may lead to inflationary scenarios.
- The systemic shock in global economic activity is much more rapid than in the financial crisis of 2007-08.

The proposed scenarios take into account the already approved measures for containing the pandemic and for mitigating the economic damage. However, they differ with respect to their assumptions about further progression of the pandemic and their effectiveness. The scenarios forecast progression of the pandemic and feedback between pandemic progression and economic development.

SCENARIO 1: "OPTIMISTIC" SCENARIO

The pandemic and containment measures result in a collapse of European and global economic activity. However, government based stimulus measures mitigate the collapse. There are no further losses at global capital markets (stocks, bonds, FX).

SCENARIO 2: "PESSIMISTIC" SCENARIO

The pandemic and containment measures result in a collapse of global economic activity. The collapse is more pronounced than in the optimistic scenario. Government stimulus measures partially mitigate the collapse. Negative prospects for the global economy lead to additional turbulence and steep losses at global capital markets (stocks, bonds, FX). Furthermore, particularly vulnerable sectors, such as air travel, tourism and gastronomy, experience credit defaults and insolvencies.

SCENARIO 3: "WORST CASE"

The increased death toll and rate of illness-related absence lead to enhanced government driven containment measures resulting in a much more pronounced eco-

nomical collapse in 2021. In addition, economic stimulus measures turn out to be insufficient and there are further steep losses at global capital markets. In addition, particularly vulnerable sectors, such as air travel, tourism and gastronomy, experience credit defaults and insolvencies. For heavily indebted countries, such as Spain, Italy or Greece, credit spreads widen significantly and sovereign debt to be written-off as a consequence.

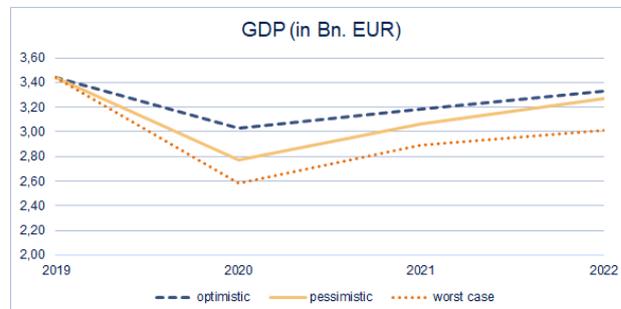


Figure 2: Example of the progression of German GDP collapse for the three described scenarios in the text, assuming specific values for collapse, shutdown and recovery durations. Based on a model of the Ifo Institute for Economic Research [3].

A substantial step in making the scenario narratives tangible is the implementation of a modular and parameterised scenario toolkit, see Figure 2 for the result of a parameterisation: Severity and duration can be modified depending on the underlying assumptions. This makes it possible to respond to the current state of the pandemic and to modify the scenarios accordingly.

Credit spreads as a crisis indicator

Going beyond scenario narratives and the development of macroeconomic parameters, we develop the relationship between model parameters and risk factors of individual risk types. Besides models for specific portfolios, e.g. for real estate, we also provide comparisons with earlier crises. This allows for an estimation of severity as well as for short-term ad-hoc analyses. As an example, we consider the evolution of credit spreads as an indicator of trust of market participants in different sectors, i.e. financial services and manufacturing, as well as trust in selected European countries, see Figure 3:

- Some 10-day yields for financial services as well as manufacturing have already reached levels last seen in the heights of the financial crisis of 2007-08. However, they recovered in the days since.
- For public debt on the other hand, 10-day yields, for the most part, did not reach levels seen in the European sovereign debt crisis. Spreads have narrowed since.

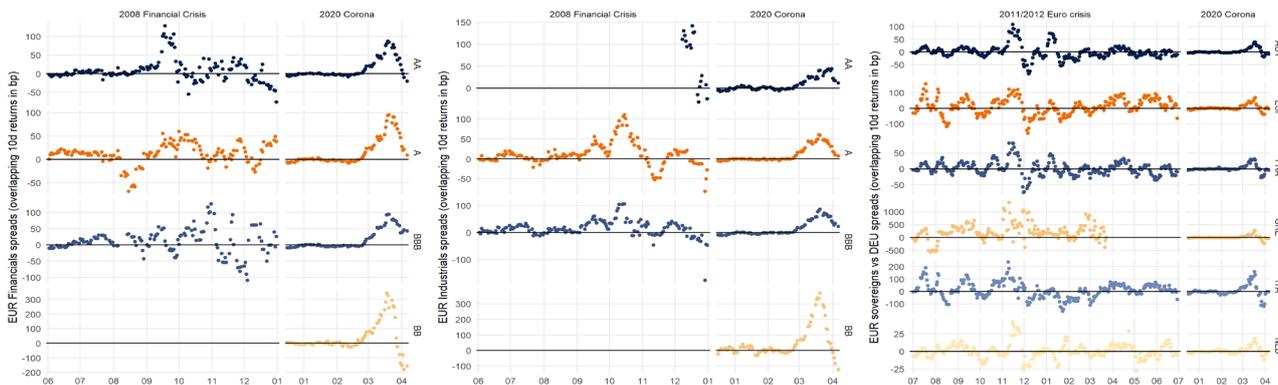


Figure 3: Overlapping 10-day yields, i.e. the absolute change of level within 10 trading days in the sector rating spreads of four rating bands for financial services (left) and manufacturing (middle) as well as for a selection of European states (right). Source: Reuters.

Following the initial steep drops on financial markets, investors are possibly beginning to show trust in government measures and stimulus programs, at least in bond markets. This suggests expectations of economic consequences stabilising.

Further evolution of the pandemic and of the counter measures will determine the long-term trajectory. The shock experienced in March does, nonetheless, give some indication of the possible severity of further developments. The ability to parameterise our models makes it possible to prepare for the pandemic's further progression at a risk factor level and to respond correspondingly to its economic consequences.

We support you

d-fine has longstanding experience in modelling risks, designing and implementing stress-testing simulations and scenarios as well as the implementation and evaluation of regulatory and internal stress tests. Our proprietary stress-testing tool for analysis and determination of required relevant parameters has proven its worth in implementing the latest EBA stress tests.

We can support you in application of our COVID-19 scenarios and determining their impact through the functionality provided by our tool.

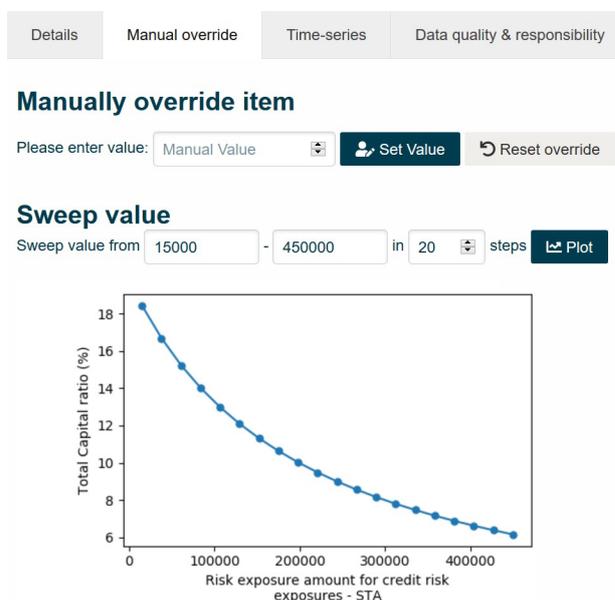


Figure 4: With the d-fine stress-testing tool the effects on key indicators can easily and be analysed and visualised graphically..

References

- [1] "Report 9: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand", Imperial College COVID-19 Response Team, 16.3.2020.
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