Continuous Solvency Monitoring with the SolvencyWatch™ Solution

A GUIDE FOR INSURERS

MOODY'S ANALYTICS

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Moody's Analytics SolvencyWatch solution enables insurers to monitor their key solvency metrics on a continuous basis.

This guide outlines the challenges faced by Chief Risk Officers (CROs) in monitoring and managing their business in the wake of recent market volatility, and how Moody's Analytics SolvencyWatch can help address these.

We begin by reviewing recent market volatility and how solvency ratios reported under Solvency II have evolved over a similar period. We then recap some of the challenges for CROs that have come to the fore during this period of recent market volatility. Finally, we look in more detail at how SolvencyWatch can be used to provide updates to real-time solvency metrics without the need to re-run the business's full valuation model. In particular, we use SolvencyWatch to demonstrate how market volatility affects key solvency metrics in an example cash flow model for a French insurer's participating business.

Click Learn More to get an overview of Moody's Analytics SolvencyWatch solution.

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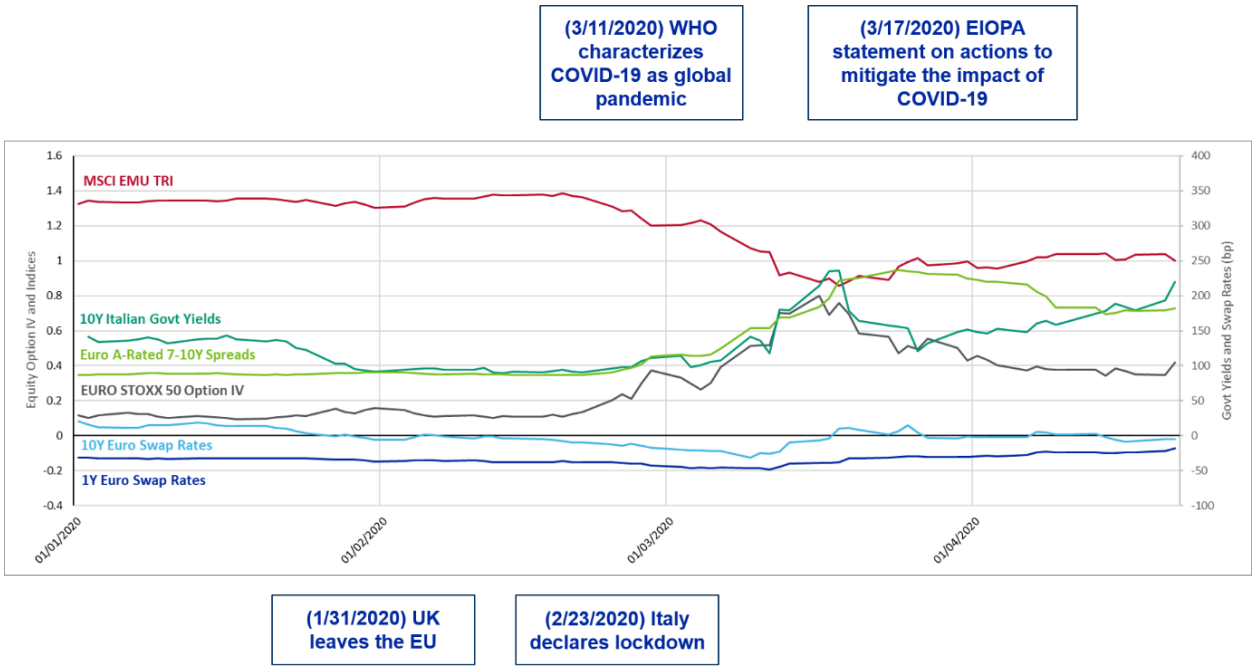
Recent market events

We begin by considering the recent economic and financial environment during H1 2020 before looking back over a longer period following the introduction of Solvency II (2016–2020).

Market volatility: Recent events – H1 2020

Global markets suffered a material negative shock in the first quarter of 2020, dominated by the impact of the COVID-19 pandemic. The economic outlook remains uncertain and it is unknown how quickly markets will recover. This uncertainty is reflected in the increased amount of market volatility.

Figure 1: Eurozone key market variables, H1 2020



Source: Refinitiv

Figure 1 shows the short-term changes to five key Eurozone indicator financial variables: the MSCI EMU TRI representing equity markets, 10-year Italian government yields, Euro A rated 7-10-year spreads, the Eurostoxx50 Option IV, and 1-year Euro swap rates. In summary:

- Yield curves have been flattening and heading into negative territory
- Equity markets have fallen and equity volatility has risen
- Credit and government spreads have been widening

The rate of change in these market variables has been accelerating with a direct impact on the insurance sector through:

- Changing liability valuations
- Increased cost of guarantees
- Increased risk on balance sheets

Market volatility: 2016 – present

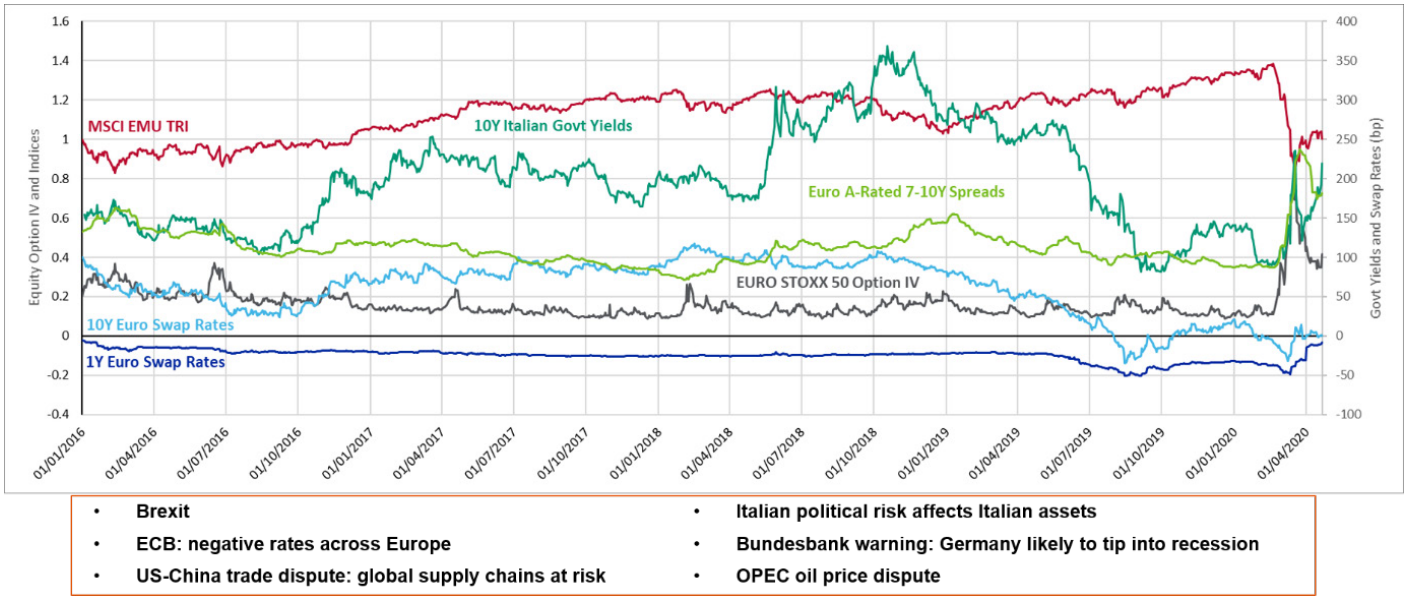
The first quarter of 2020 has been an exceptionally challenging period, but the preceding four years have been far from smooth sailing. Figure 2 looks at the same European market variables over the period from January 1, 2016 to January 1, 2020 (that is, since Solvency II has been in effect). Within this period, we have highlighted some events that have affected European markets:

» The prolonged process of Brexit and its implications for the insurance sector

» The Italian general elections and the associated political risk have affected the price of Italian assets

» The Bundesbank warning that Germany could "tip into recession," with the prospect that the European safehouse becomes seen as a less secure destination for assets in a "flight to safety"

Figure 2: Eurozone key market variables, 2016–2020



Source: Refinitiv

More broadly, in the economic environment over this same period, we have seen:

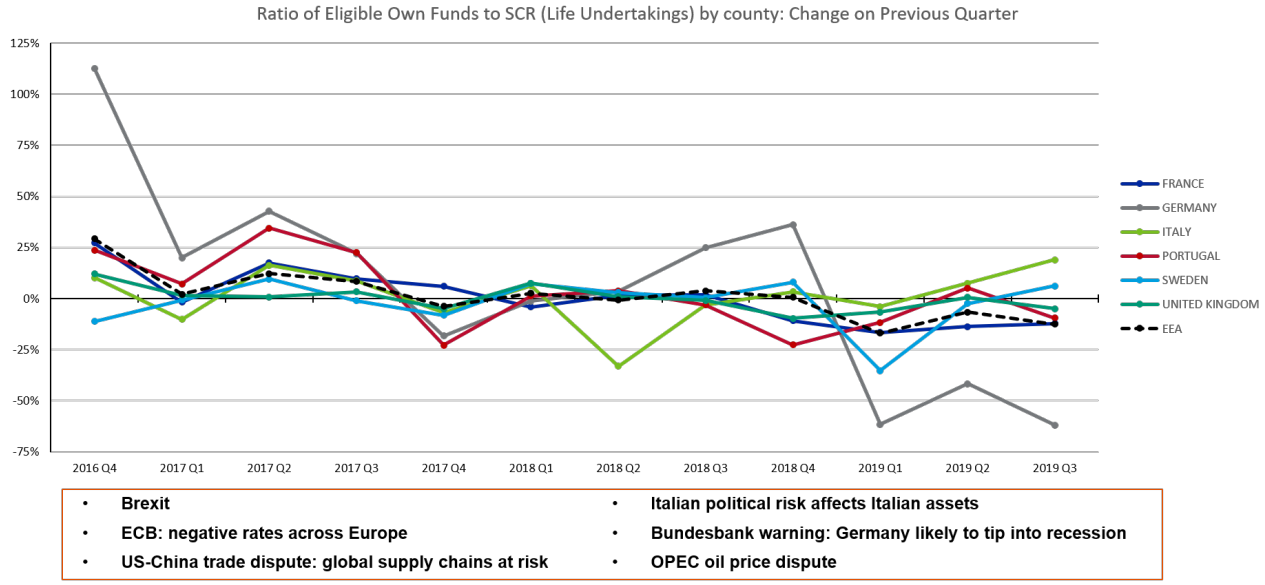
» The persistence of negative rates across Europe stemming from European Central Bank (ECB) policy

» The US-China trade dispute putting global supply chains at risk

Figure 2 does not seek to attribute a specific cause to the observed market movements, but rather to highlight that key European and global markets have been affected by various risk drivers during the short period Solvency II has been in effect. These drivers can be economic, geopolitical, financial, or regulatory in nature. It may be reasonable to assume that such volatility is set to continue given the uncertainty associated with the COVID-19 pandemic and its impact on the worldwide economy.

Solvency II aims to provide a market-consistent balance sheet; thus, it is sensitive to market movements. Volatile markets can then lead to volatile solvency positions, as shown in Figure 3.

Figure 3: Change in national average solvency ratio, 2016–2020



Source: EIOPA

Figure 3 shows European Insurance and Occupational Pensions Authority (EIOPA) data for the absolute quarter-on-quarter change in average solvency ratios for life insurance companies in several European countries from 2016 to 2020. This change is defined as the ratio of eligible own funds to Solvency Capital Requirement (SCR). These averages represent several companies, so solvency ratios of individual companies may be more or less volatile. However, we may still observe that:

» The solvency ratio is a volatile metric with significant moves in the country averages across Europe

» For many economies, the solvency ratio decreased significantly during 2019

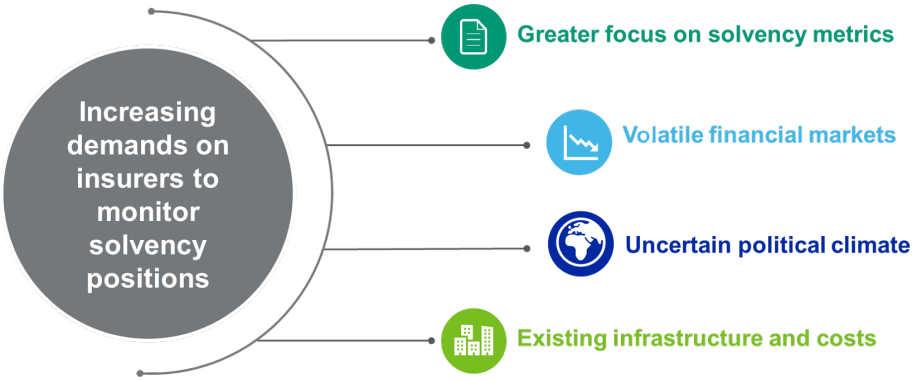
Reviewing published Solvency and Financial Condition Reports (SFCRs), many companies found themselves operating with solvency ratios in the region of 150%–200% or below.

Between quarterly measures, the solvency ratio is unknown. It could correspond to some intermediate point between measurements but equally it could be outside this range. Although Figure 3 shows only changes in solvency ratios for European insurance companies reporting under Solvency II, where similar market-consistent solvency regimes are in place in other countries, similar volatility in solvency ratios may be expected.

Challenges facing Chief Risk Officers (CROs)

CROs have a key responsibility to identify and manage risks to their business, including those relating to the firm's overall solvency. Regulatory reporting under Solvency II requires the solvency of the firm to be calculated and reported on a quarterly basis. However, the previous sections in this guide have highlighted the volatility of financial markets and, by inference, solvency ratios over much shorter time periods.

Therefore, there has been increased demand both from regulators and internally within firms to calculate solvency metrics with greater frequency and on an ad hoc basis following significant market movements. Such calculations ensure that companies can remain solvent and prevent capital from being paid out (for example, as dividends) if this cannot be afforded.



However, increasing the frequency with which solvency metrics are calculated can increase the demands on risk teams and the CRO, putting pressure on existing infrastructure and leading to capacity constraints or increased costs.

Moody's Analytics SolvencyWatch solution

Overview

Moody's Analytics SolvencyWatch solution delivers frequent calculation of key solvency metrics under changes to market and non-market (life) risks to support CROs and risk teams monitoring insurers' capital positions. It uses a light modeling framework developed by Moody's Analytics and is intended to provide CROs with real-time solvency metrics, such as the solvency ratio.

The core of the solution is an easy-to-use light model developed by Moody's Analytics which captures the key features and dynamics of a client's full liability model. The light model requires only a small amount of key market data to update estimates of solvency metrics, such as the solvency ratio, asset values, best estimate of liabilities (BEL), required capital, and own funds. The solution does not require users to re-run the full liability model to estimate the value of the liabilities following market movements, and it can be run on a normal desktop or laptop computer. This enables solvency metrics to be monitored frequently—for example, daily if necessary—or on demand following a significant market movement.

The solution can also be used to deliver additional insight, such as the key risk drivers (for example, interest rates or equity levels) responsible for observed changes in an insurer's balance sheet. This data can be invaluable for delivering a narrative on observed changes in solvency metrics when, for example, communicating results both within and outside of the company.

In addition to monitoring and estimating a firm's current solvency position, the solution can be used for forward-looking "what-if" investigations. These allow insurers to estimate the impact of possible future market changes such as interest rates and government spreads on the solvency position of the insurer. This information can be informative for business planning, particularly when markets are volatile.

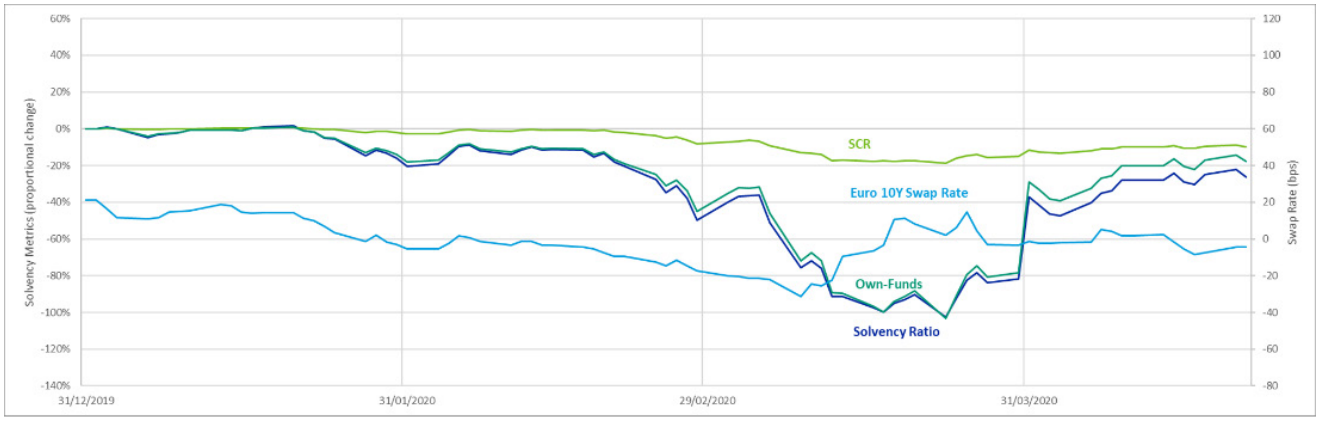
Moody's Analytics SolvencyWatch in action

French participating business: Example

To understand the impact these challenging market conditions could have on a solvency ratio, we created an example cash flow model for a French participating business. In Figure 4, values for the business's own funds, SCR, and solvency ratio are plotted alongside one of the key risk factors (the Euro 10-Year swap rate) over H1 2020.

This risk factor corresponds to real market values (sourced from Refinitiv), while the continuum of values for the key solvency metrics is generated using Moody's Analytics SolvencyWatch solution.

Figure 4: Key solvency metrics for French participating business, H1 2020



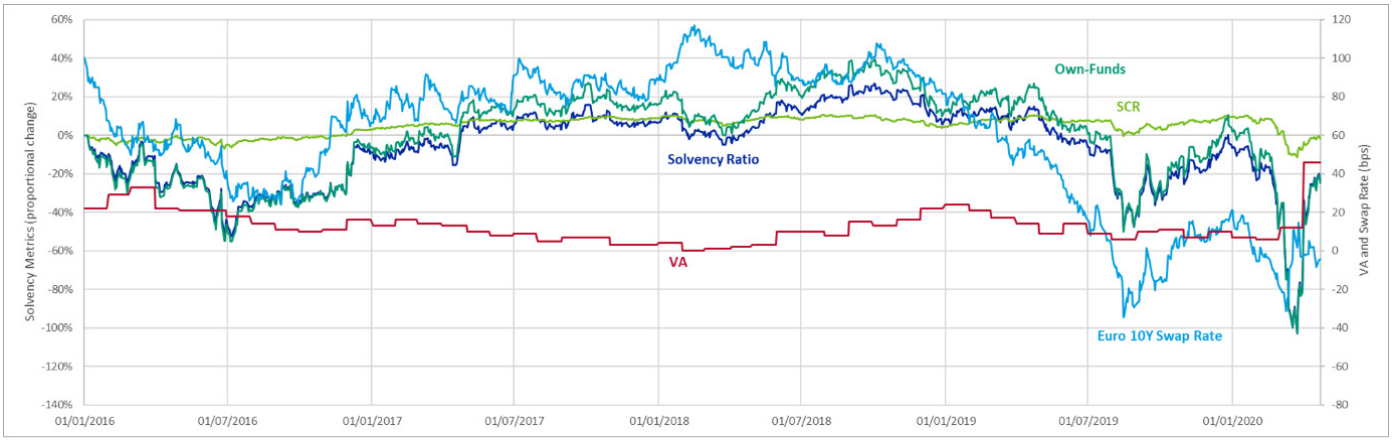
- Change in interest rate levels
- Change in government spread levels
- Change in equity return levels
- Change in swaption and equity implied volatility
- Change in volatility adjustment
- Change in credit spread levels

Sources: Market Data from Refinitiv, Solvency Ratio, SCR, and Own Funds from SolvencyWatch

The effect of the ongoing market volatility in the wake of the pandemic can be clearly observed in the solvency ratio throughout H1 2020, and in particular during March 2020. The modeled solvency ratio is also a volatile metric and material changes are apparent over short timescales.

The same analysis was also extended over the period spanning 2016 to the present day and is shown in Figure 5.

Figure 5: Key solvency metrics for French participating business, 2016–2020



- Brexit
- ECB: negative rates across Europe
- US-China trade dispute: global supply chains at risk
- Italian political risk impacts Italian assets
- Bundesbank warning: Germany likely to tip into recession
- OPEC oil price dispute

Sources: Market Data from Refinitiv, Solvency Ratio, SCR, and Own Funds from SolvencyWatch™, VA from EIOPA

The effect of the ongoing market volatility in the wake of the pandemic can be observed clearly in 2020; however, it is worth noting that material volatility has existed since Solvency II took effect in 2016.

The solvency metrics seen here were all generated applying SolvencyWatch to the example cash flow model of the French participating business. Historic market data for discount rates, government yields, equity levels and so on. were then used to evaluate the metrics at each time step. In our solution, the actual market data used was chosen to capture the key risk factors that relate to the underlying business being modeled.

As a light modeling solution, SolvencyWatch can calculate the solvency metrics for the entire time series shown, using the input market data, in a matter of minutes.

Forward-looking scenarios

In addition to assessing the current (or historic) solvency position of the firm, insurers can also benefit from considering forward-looking narrative scenarios. These scenarios reflect a range of possible future outcomes for the economy based on current conditions, economic models, and the expert view of economists, and can be used to understand how key metrics such as profit, liquidity, and capital are likely to change under various "what-if" states of the world.

More details on the value of narrative scenarios can be found in the following whitepaper: Narrative Economic Scenarios as an Actuarial Risk Management Tool – July 2020, Sohini Chowdhury

SolvencyWatch can be used to directly establish the impact of such scenarios on the solvency of the company using the same light models used for solvency monitoring. Moody's Analytics narrative scenarios can be provided in a format to allow direct upload into SolvencyWatch for ease of use.

How does the SolvencyWatch solution work?

The modeling methodology for SolvencyWatch has been developed by Moody's Analytics over many years. While it incorporates many sophisticated modeling techniques, the solution itself has an easy-to-use interface, and a managed service for light model calibration and daily use. The solution workflow is summarized in Figure 6.

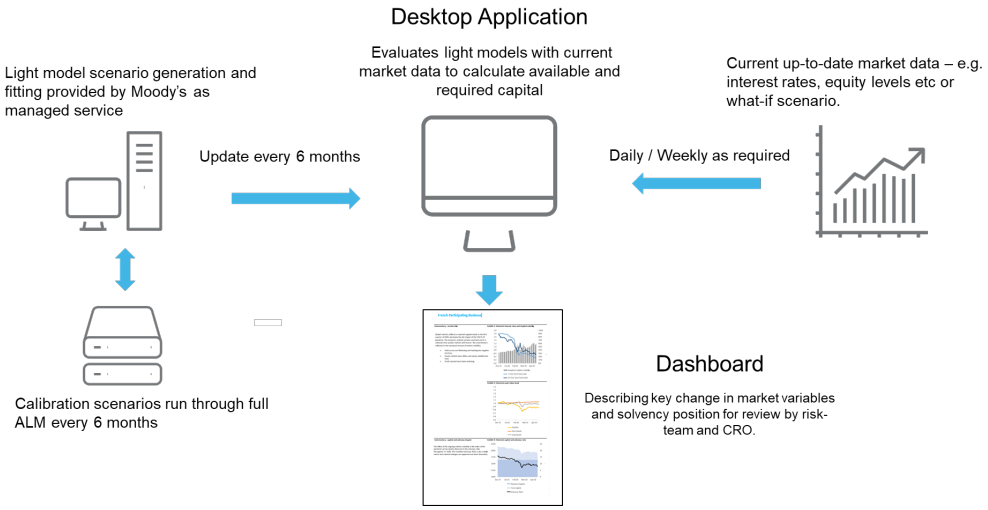
Light models are first tailored to capture an insurer's specific market risk exposures and calculate asset and liability values under changing market conditions. These are recalibrated every six months by Moody's Analytics and delivered as part of a managed service.

The light models are designed to readily accept market data as key variables. These are both observable and intuitive rather than abstract inputs such as changes to model parameters. Up-to-date market data can be provided as inputs to the tool as frequently as is required.

These inputs are risk factors that describe current market conditions, such as swap and government interest rates, equity index levels, asset volatilities, and the volatility adjustment. The actual number and choice of these risk factors will depend on the underlying business being modeled and its sensitivities. For example, we would not include an equity index level risk factor if the underlying business had no exposure to equities. We can also include risks such as swaption-implied volatility and government spread risk, which are not treated directly within the Solvency II Standard Formula.

The tool performs a roll-forward of own funds based on the impact of market movements on the book of in-force business at a point in time (the calibration date). Additional adjustments are then made to account for changes in the in-force business over time such as new business and the run off of existing in-force business.

Figure 6: Components of the SolvencyWatch solution



Sources: Market Data from Refinitiv, Solvency Ratio, SCR, and Own Funds from SolvencyWatch

SolvencyWatch calculates fund-level output for best estimate of liabilities (BEL) and assets such as government bonds, corporate bonds, and equities. The valuations reflect the market conditions described by the input risk factors. In addition, for asset and liability valuations the tool can also output an estimate of the Solvency II Standard Formula univariate stresses for the Market and Life sub-modules. These may be combined to estimate required capital and the firm's solvency ratio. The solvency ratio can be estimated daily if necessary, because only a small amount of market-available data is required as input. Key results can be quickly collated on a dashboard for review by the risk team and CRO.

Benefits for the risk team

How can SolvencyWatch benefit CROs?

Moody's Analytics SolvencyWatch solution can produce real-time estimates of key solvency metrics such as own funds and the solvency ratio. This enables CROs to monitor their business effectively and to understand the implications of market movements as they occur. Effective monitoring allows CROs to demonstrate greater control of their business and to take any corrective or remedial actions that may be required in a more timely manner.

As an example, SolvencyWatch can help insurers manage their year-end solvency position. This process can be important as many insurers seek to maintain this ratio within certain boundaries as decided by their Board, which may have been publicly disclosed. By closely monitoring the firm's solvency ratio around year-end, an insurer can take corrective actions to ensure that it can maintain the solvency ratio within these boundaries. This can be problematic for full liability models given the time taken to set up, perform runs, and collate output.

In addition to real-time estimates of solvency metrics, SolvencyWatch can also help produce a narrative to explain why a firm's solvency position has moved in a particular way following observed market movements. This tool can be used to delineate the impacts of the observed market movements through an "analysis-of-movements." If interest rates and equity values moved between two dates, it is possible to attribute the impact of interest rates and equity values individually on the observed solvency ratio. This is useful when markets are volatile and several market variables are all materially changing at once.

The SolvencyWatch solution may also be used to look at the impact of possible future scenarios on a firm's balance sheet through a "what-if" capability. This is achieved by expressing the future scenarios in terms of key input risk factors such as equity index

levels or interest rates. This can be helpful if future market volatility is anticipated or more generally in setting appropriate triggers as part of a wider risk-management framework.

Figure 7 summarizes the impact of using Solvency Watch to perform frequent re-estimation of key solvency metrics for one of our European insurance clients:

Figure 7: Business impact from SolvencyWatch

	Frequency	Accuracy	Access to on-demand what- if capability	Explains why solvency position has changed	Impact on resources	Satisfying demands for solvency updates
Pre-SolvencyWatch	Key reporting dates only	High – assuming full ALM run	Limited	Low	High	Low
SolvencyWatch	Daily	High	Unlimited	High	Low	High

SolvencyWatch is a cost-effective solution that is delivered as a managed service and is being used by insurers across Europe to support their business. As part of the solution, insurers benefit from support and access to Moody's Analytics team of technical experts.

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