

The architecture of the Swiss Solvency Test

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Before the SST, Swiss insurers calculated their solvency under the so-called Solvency I rules, which were modelled on the European directives of the 1970s. The required solvency margin was a percentage of premiums or claims in non-life insurance and of the mathematical reserves and capital at risk in life insurance.¹ These formulas had the advantage of simplicity but bore no relation to the actual risks of the insurer. A company that invested its reserves entirely in equities needed the same capital as a company that matched its liabilities with high-quality bonds. When markets fell sharply in 2001 and 2002, the Solvency I margins of several companies remained apparently adequate while their economic position deteriorated rapidly.

The SST was designed to measure the economic reality. Its development began in 2003 under the BPV in a dialogue with the industry, actuaries and academics. After field tests in 2004 and 2005, the SST entered into force with the VAG on 1 January 2006, initially with a transitional period.² Large insurers were required to calculate the SST from 2008, all insurers from 2011, when the transitional period ended and the SST became the binding solvency regime.³ At that time the European Union was still negotiating Solvency II, which was adopted in 2009 but did not apply until 1 January 2016. Switzerland therefore had a fully risk-based and market-consistent solvency regime five years before the European Union.

The basic idea of the SST is simple to state. An insurer must hold enough capital, measured on a market-consistent basis, to absorb the losses that may arise in a very adverse year and still be able to transfer its liabilities to another insurer or to run them off in an orderly fashion. The SST compares the available capital, called risk-bearing capital (*risikotragendes Kapital*), with the required capital, called target capital (*Zielkapital*).⁴ The quotient of the two, adjusted for the risk margin, is the SST ratio. A ratio of 100 per

cent means that the insurer meets the target exactly, while ratios above 100 per cent indicate a capital buffer.

The risk measure of the SST is the expected shortfall at a confidence level of 99 per cent over a one-year horizon, also known as tail value at risk. It is defined as the average loss in the worst one per cent of scenarios for the change in risk-bearing capital over one year.⁵ This choice distinguishes the SST from Solvency II, which uses the value at risk at a confidence level of 99.5 per cent over one year. The difference is more than a technicality. The value at risk only measures the threshold beyond which the worst 0.5 per cent of outcomes lie, whereas the expected shortfall takes into account how severe these outcomes are. Expected shortfall is therefore more sensitive to heavy-tailed risks such as natural catastrophes, pandemics or financial crises. It also has the mathematical property of subadditivity, which means that the risk of a combined portfolio cannot exceed the sum of the risks of its parts.⁶ The Basel Committee adopted the expected shortfall for the market risk framework of banks in the Fundamental Review of the Trading Book in 2016, a decade after the SST.

For a typical distribution of insurance risks, the expected shortfall at 99 per cent and the value at risk at 99.5 per cent lead to results of a similar order of magnitude. The calibration of the SST was therefore intended to be broadly comparable to that of Solvency II, although the details of the models and the treatment of particular risks lead to considerable differences in individual cases.⁷ These differences became the subject of a long debate on whether Switzerland imposes stricter requirements than the European Union, which is discussed below.

1 Notes

1. On the Solvency I rules as applied in Switzerland before the SST and abolished with effect from 2011, see Arts. 23 ff. of the earlier AVO and the corresponding EU directives (Directive 2002/13/EC and Directive 2002/83/EC). To be verified. ↩
2. BPV, White Paper of the Swiss Solvency Test, November 2004; BPV, Technisches Dokument zum Swiss Solvency Test, 2006; field tests 2004 and 2005. Titles and dates to be verified. ↩
3. On the phased introduction of the SST (2006 entry into force, 2008 for large companies, binding for all insurers from 1 January 2011), see FINMA, SST publications and the AVO transitional provisions. To be verified. ↩

4. Art. 9 VAG and Arts. 21–53 AVO (as revised) on the SST; FINMA, SST technical documentation and standard model descriptions. Article numbers to be verified. ↩
5. Art. 41 AVO (as revised) and FINMA SST documentation: target capital as the expected shortfall at 99% of the change in risk-bearing capital over one year, plus the market value margin. To be verified. ↩
6. On the theoretical properties of expected shortfall as a coherent risk measure, see Artzner/Delbaen/Eber/Heath, "Coherent Measures of Risk", *Mathematical Finance* 9 (1999), 203–228; on the choice of the expected shortfall in the SST and its comparison with the VaR 99.5% of Solvency II, see the actuarial literature. To be verified. ↩
7. On the broad comparability of ES 99% and VaR 99.5% for normally distributed risks and the divergence for heavy-tailed risks, see the actuarial literature and FINMA and EIOPA comparisons in connection with the equivalence assessment. To be verified. ↩

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