

Switzerland: Financial Sector Assessment Program; Technical Note-Insurance Stress Testing



SWITZERLAND

FINANCIAL SECTOR ASSESSMENT PROGRAM

TECHNICAL NOTE—INSURANCE STRESS TESTING

June 27, 2019

This Technical Note on Insurance Stress Testing for the Switzerland FSAP was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed in May 2019.

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SWITZERLAND

FINANCIAL SECTOR ASSESSMENT PROGRAM

June 12, 2019

TECHNICAL NOTE

INSURANCE STRESS TESTING

Prepared By
**Monetary and Capital
Markets Department**

This Technical Note was prepared by IMF staff in the context of the Financial Sector Assessment Program in Switzerland. It contains technical analysis and detailed information underpinning the FSAP's findings and recommendations. Further information on the FSAP can be found at <http://www.imf.org/external/np/fsap/fssa.aspx>

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Glossary

BU	Bottom-Up
CHF	Swiss francs
EUR	Euro
FINMA	Swiss Financial Market Supervisory Authority
FSAP	Financial Sector Assessment Program
FX	Foreign Exchange
GAAP	Generally Accepted Accounting Principles
IFRS	International Financial Reporting Standards
LTV	Loan-to-Value
ORSA	Own Risk and Solvency Assessment
OTC	Over-the-Counter
RBC	Risk-Bearing Capital
SST	Swiss Solvency Test
STEM	Stress Testing Matrix
TD	Top-Down
UL	Unit- and Index-Linked Business
USD	U.S. dollars

EXECUTIVE SUMMARY

Swiss insurers are broadly resilient against the market shocks evaluated in the stress test. The resilience of insurance companies was assessed through top-down and bottom-up stress tests. Six insurance groups participated on a consolidated basis, ensuring a market share of 56 and 45 percent in the domestic life and non-life sectors, respectively. Stress tests and sensitivity analyses were built on the SST and the scenarios broadly aligned with the banking stress test's macrofinancial shocks, focusing however more on market risks relevant for insurers.

Stress test participants' capital exceeds by a wide margin the conservatively calibrated regulatory requirements before stress, and most groups have diversified activities in life and non-life businesses. The SST is an established solvency standard and all six participants record solvency ratios well above the regulatory threshold of 100 percent. Their investment holdings are characterized by a high share of fixed-income securities, with 37 percent in sovereign bonds and another 29 percent in corporate bonds. Real estate investments account for another 11 percent. The bond investments are of good credit quality and sovereign bond exposures are well diversified.

In the adverse scenario, the median solvency ratio drops from 224 to 176 percent, and no company records a ratio below the 100 percent regulatory threshold. Assets decline by 4 percent, compensated partially by a decrease in liabilities by 1 percent. The main impact stems from higher credit spreads, as well as from the shocks to equity and real estate prices—together, the value of bonds, equity and real estate drops by an amount equivalent to 45 percent of risk-bearing capital. The interest rate shock and the currency shock contribute considerably less. In general, the stress is more pronounced for life business where bond investments have longer maturities and sensitivities to spread changes are accordingly higher.

Over a medium-term horizon, insurers are likely to face declining investment returns as higher-coupon bonds will expire. The implementation of the Swiss Solvency Test (SST) has improved asset-liability matching. Accordingly, investment horizons have lengthened and reinvestment risks in the short term are limited and, on aggregate, participating groups still record positive spreads of investment returns over guaranteed interest rates. While insurers which are more active in non-life and unit-linked life business are less affected, and could sustain the current low-yield environment for a prolonged period, companies with a high stock of guarantees on their policies are likely to experience a drain on their profitability.

Table 1. Switzerland: Main Recommendations on Insurance Stress Testing			
#	Recommendations and Responsible Authorities	Timing*	Priority**
1	Regularly conduct stress tests for large insurers, based on macrofinancial scenarios, and analyze insurers' potential for recovery after stress (FINMA); ¶23	ST	H
2	Closely monitor the credit spread and real estate exposures of insurers, including co-movements of risk factors and insurers' risk mitigation techniques (FINMA); ¶24	ST	M

* C = Continuous; I = Immediate (within one year); ST = Short Term (within 1–3 years); MT = Medium Term (within 3–5 years).

** H = High; M = Medium; L = Low.

INSURANCE STRESS TEST¹

A. Scope of the Stress Test and Risk Profile of the Insurance Sector

1. The resilience of insurance companies was assessed through bottom-up (BU) and top-down (TD) stress tests.² Six insurance groups participated on a consolidated group basis, including all insurance activities worldwide. Most groups pursue a diversified business model with significant operations abroad. Still, the Swiss lines of business of the participating groups covered a market share of 56 and 45 percent in the domestic life and non-life sector, respectively, in terms of premiums. One large insurance company was not included in the stress test due to an ongoing restructuring of its Swiss life insurance business.

2. Swiss insurers have seen a material decline in new individual life business in recent years, in particular with regard to traditional (guaranteed) life products. Compensating for this decline, hybrid products are offered which are partially unit-linked and partially classic long-term interest rate guarantees (currently with a maximum 0.05 percent for single premium and 0.25 percent for annual premium due to regulatory requirements). Furthermore, products with shorter-term guarantees and “capital light” products with internal equalization reserves have been introduced by some companies. In the group life business, insurers scaled back the available capacity in the full coverage insurance sector (“Vollversicherung”) and concentrated instead on reinsuring the risks of death and disability.

3. The prolonged low-yield environment is still challenging for insurers, although Swiss insurers adapted their business models earlier than many other European peers. Life insurance premiums have been declining in recent years, and low interest rates pose a drain on life insurers’ profitability, in particular on those with larger legacy business carrying high interest rate guarantees. Overall, however, the level of interest rate guarantees is lower than for other European peers: 48 percent of life insurance liabilities carry no guarantee or a rate of up to 1 percent; only 29 percent have a guaranteed rate of more than 2 percent. Investment yields came down from 3.3 percent in 2013/14 to 2.5 percent in 2017, and the return on equity averaged 8 percent over the last five years. In this environment, Swiss insurers have reacted by reducing the volume of guaranteed business, focusing more on protection products and products with low or even no guarantees attached. Furthermore, the regulatory framework, in particular the early implementation of the Swiss Solvency Test, has contributed to a closer match of assets and liabilities which has reduced interest rate sensitivity. Non-life insurers, which are less affected by the low-yield environment, record fairly comfortable profits. Non-life premiums declined between 2014 and 2016. Nevertheless, the combined ratios of primary non-life insurers were consistently below 90 percent over the last five years, and the return on equity averaged 17 percent. In the reinsurance sector, profits tended to be more volatile, but even in years with large natural catastrophes like 2017, with a very intense hurricane season, the sector on aggregate remained slightly profitable.

¹ This note was prepared by Timo Broszeit, independent expert on insurance stress testing.

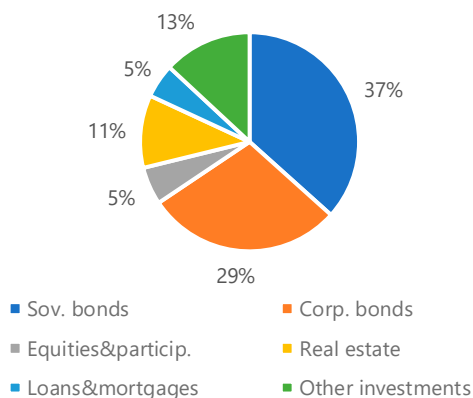
² In Switzerland, there are no large bank-insurance cross holdings, so that the STs were conducted on a stand-alone basis.

4. The investment holdings of participating groups are geographically well diversified (Figure 1). Investment assets are characterized by a high share in fixed-income securities, with 37 percent in sovereign bonds and another 29 percent in corporate bonds. Real estate investments account for another 11 percent, and only this asset class is characterized by a strong home bias. In a search for higher yields, some companies have also expanded their mortgage loan portfolios, exposing them further to real estate and potentially liquidity risks. The bond investments are of good credit quality with 59 percent being rated AAA or AA, and 96 being investment grade. Sovereign bond exposures are also well diversified. Besides Swiss government bonds (16 percent), U.S. and German government bonds are the largest positions with 20 and 11 percent, respectively.

Figure 1. Switzerland: Asset Allocation of Insurance Stress Test Participants

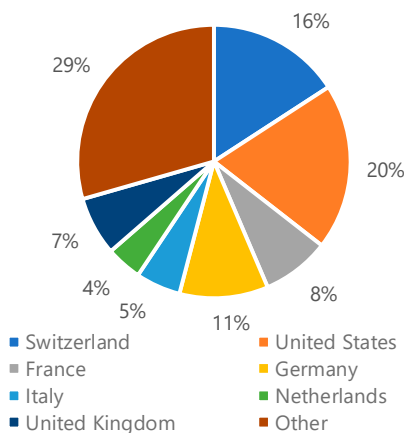
Excluding unit-linked business, bonds account for two thirds of insurers' investment assets....

Investments Assets
(In percent; excl. assets covering UL business)



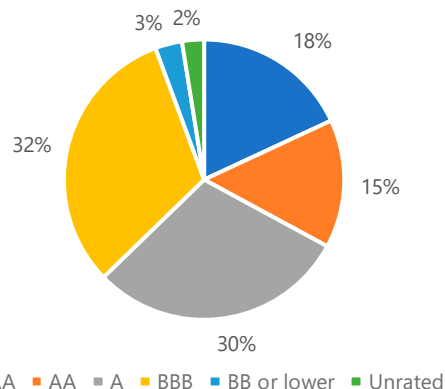
As sovereign bonds are used to match non-CHF liabilities, the geographic diversification is high, and Swiss government bonds account for only 16 percent.

Sovereign Bond Breakdown
(In percent)



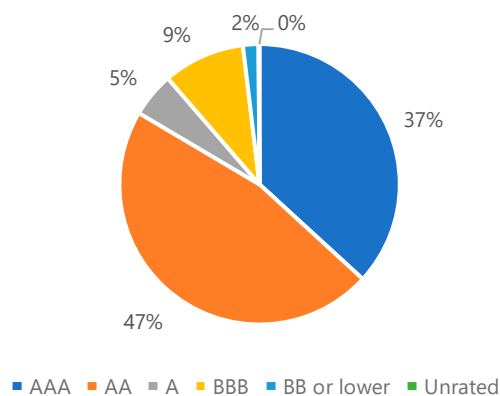
... but ratings are strong: 33 percent of corporate bonds are rated AAA or AA, and only 3 percent below investment grade.

Corporate Bond Ratings
(In percent)



In this diversified sovereign bond portfolio, 83 percent carry a AAA or AA rating.

Sovereign Bond Ratings
(In percent)



Source: IMF staff calculations based on company submissions.

B. Scenario

5. The adverse scenario was broadly aligned with the banking stress test's macrofinancial shocks. The scenario mirrors a global financial cycle downturn, which combines disruptions on global equity and bond markets, interbank market stress, a correction of house prices and a global confidence loss, with the latter three of these factors being amplified in Switzerland. The adverse scenario included a substantial increase in the yield of Swiss government bonds, equity and property price shocks, and higher default rates for mortgage loans. Furthermore, an appreciation of the Swiss franc was assumed, which would weigh on Swiss insurers' foreign exchange (FX)-denominated asset holdings.

6. For coherence, the stress scenario for the insurance sector was slightly adjusted and refocused. The narrative and overall severity is roughly the same, but while for the banking stress test typically a projection horizon of three to five years is prescribed, for the insurance sector stress test all shocks are assumed to occur immediately after the reference date (instantaneous shock). Following this shock, companies projected their business development for a three-year period. Naturally, the focus of the scenario specification for the insurance sector thus relies on financial market variables which have been defined more granularly. The scenario includes shocks to the risk-free interest rate, equity and property prices, credit spreads of corporate and sovereign bonds, higher default rates for mortgage loans, as well as a shock to the external value of the Swiss franc (Table 2 and Appendices I and II).

7. An additional single-factor shock, assuming the default of the largest banking counterparty, complements the stress test. The result of this sensitivity analysis is not added to the results of the scenarios. The following haircuts on exposures were applied:

- A 100 percent write-off for equity exposures, subordinated bonds and loans, uncollateralized over-the-counter (OTC) derivative exposures, as well as guarantees for the counterparties' liabilities,
- A 50 percent write-off for bonds and loans, and
- A 15 percent write-off for deposits (beyond those exposures protected by a deposit guarantee scheme), loaned securities, collateralized OTC derivative exposures.

C. Capital Standard and Modeling Assumptions

8. Stress tests and sensitivity analyses were built on the Swiss Solvency Test (SST). The main output of the BU stress test calculations is the effect on risk-bearing capital (RBC) and subsequently the coverage of the target capital. Participants were asked to recalculate the target capital after stress. For simplicity, these calculations should take into account only the impact of market stresses on the exposures—a re-calibration of the risk models after the shock was not requested. Internal models, approved by the Swiss Financial Market Supervisory Authority (FINMA) for prudential purposes, were used by three groups. Management actions were allowed to be taken into account only as far as they related to non-discretionary arrangements already in place at the reference date, i.e., June 30, 2018.

Table 2. Switzerland: Specification of the Adverse Scenario for Insurers

			Change in percent	Change in basis points
Equity	domestic, listed		-23.4%	
	other advanced economies, listed		-29.6%	
	other emerging and developing economies, listed		-13.0%	
	Private equity and participations		-15.0%	
	Hedge funds		-10.0%	
Property	domestic	residential	-18.5%	
		commercial	-22.2%	
	foreign	residential	-6.3%	
		commercial	-7.6%	
Corporate bond spreads	non-financials, covered bonds, and securitizations	AAA		50
		AA		65
		A		95
		BBB		155
		BB		255
		B and lower		350
		Unrated		200
	financials	AAA		70
		AA		85
		A		125
		BBB		200
		BB		400
		B and lower		465
		Unrated		265
Sovereign bond spreads	Switzerland			137
	Euro area, low-yield			92
	Euro area, high-yield			184
	Other advanced economies			92
	Emerging and developing economies			46
	Suprationals			0
Mortgage loan default rates				130
Change of CHF against...	EUR		2.2%	
	USD		11.3%	
	GBP		5.4%	
Risk-free interest rates	Short-term (up to 1 year)	CHF		-133
		EUR		-133
		USD		-133
		GBP		-133
	Long-term (10 years and longer)	CHF		-7
		EUR		-25
		USD		-25
		GBP		-25

Source: IMF staff.

9. There is no harmonized accounting regime among participating insurance groups, but the underlying principles of the different regimes are similar. While some companies use Swiss Generally Accepted Accounting Principles (GAAP), others use IFRS or U.S.-GAAP.

10. Undertakings were requested to provide a three-year projection of business development under the baseline and the IMF's adverse scenario. Key figures requested included projected premiums, claims, lapse rates, investment returns, net earnings, insurance liabilities, risk-bearing capital, and the target capital. Projections had to be made in line with the macrofinancial scenario while the market value of investments was assumed to stay constant after the occurrence of shocks at the reference date (instantaneous shock). Therefore, any recovery in profitability, and ultimately solvency, would be driven solely by the underwriting business and recurring investment income from interest, dividends and rents.

11. To benchmark the results of the BU stress test, an additional TD stress test was run by the FSAP team, based on input data received from the companies and FINMA. Data required from the insurance undertakings included:

- A granular breakdown of investment assets, specifically on the geographical breakdown of sovereign and corporate bond holdings, the rating distribution of the bond portfolio, as well as maturities and coupon rates of fixed-income investments.
- Cash-flow projections for the upcoming 50 years.

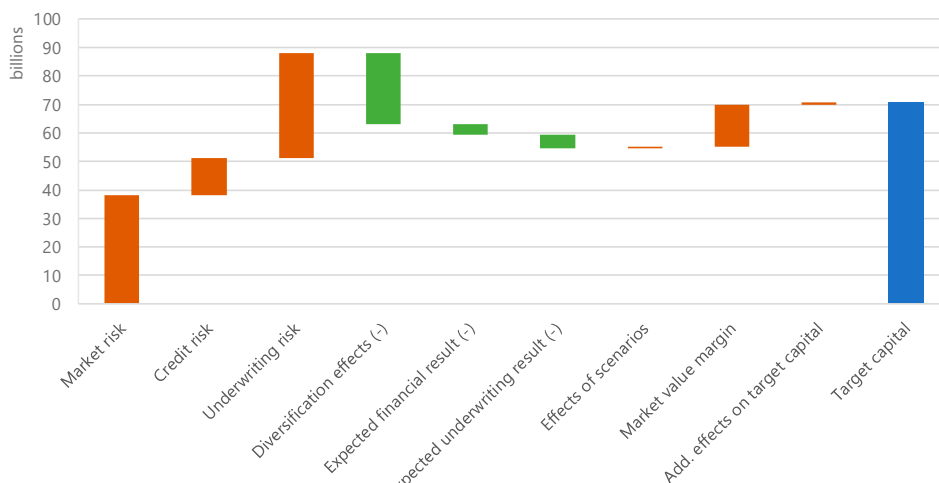
12. For the TD stress test, scenarios were applied to the investment assets and insurance liabilities. Haircuts in line with scenarios were applied to the market value of assets, and a re-valuation of fixed-income assets was undertaken with the stressed term structure (per currency). Similarly, technical provisions were re-valued with the stressed term structure. The main output of the TD stress test is the ratio of assets over liabilities—a calculation of the SST coverage ratio was not undertaken.

D. Results

13. Participating groups started from a favorable pre-stress position. All six participants record solvency ratios well above the regulatory threshold of 100 percent and the median SST coverage amounts to 224 percent. Market and underwriting risks are the two largest components in the modular calculation of the target capital, accounting for 54 and 52 percent of the post-diversification target capital (Figure 2). The quality of risk-bearing capital is good, with 90 percent being core capital, and 5 percent each being upper and lower supplementary capital.

Figure 2. Switzerland: Decomposition of Target Capital before Stress

Market and underwriting risks are the two largest components in the modular calculation of the target capital.



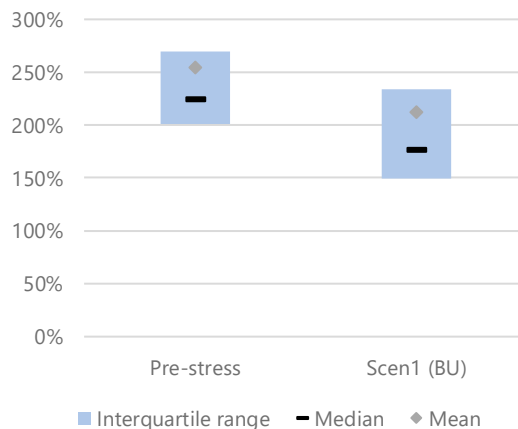
Source: IMF staff calculations based on company submissions.

14. In the adverse scenario, the median SST ratio drops from 224 to 176 percent (Figure 3), and no company records a ratio below the 100 percent regulatory threshold. Assets decline by 4 percent, which corresponds to 49 percent of risk-bearing capital. Market value losses in individual asset classes reflect their relative shares in the investment portfolio. The value of fixed-income assets shrinks by an amount equivalent to 24 percent of risk-bearing capital, while the declines in equity and real estate reduce the RBC by 9 and 11 percent, respectively. The decline in assets is partially compensated by a decrease in liabilities by 1 percent (10 percent of risk-bearing capital). In particular, the best estimate of group life liabilities declines significantly, while liabilities in property and casualty business, which are less sensitive to interest rate changes, remain broadly unchanged (Figure 4).

Figure 3. Switzerland: SST Ratio after Stress

(In percent)

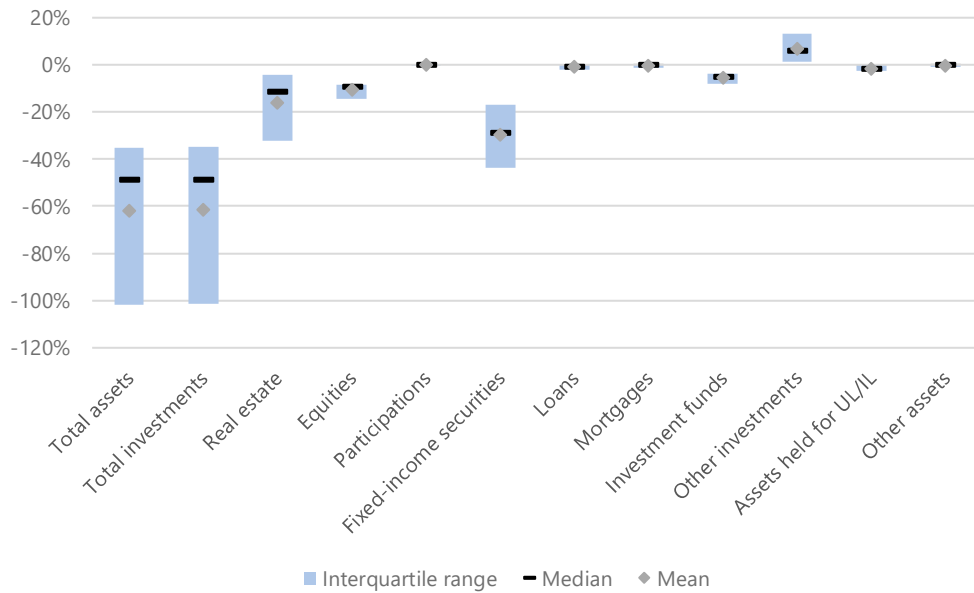
In the adverse scenario of the bottom-up stress test, the median SST ratio drops from 224 to 176 percent.



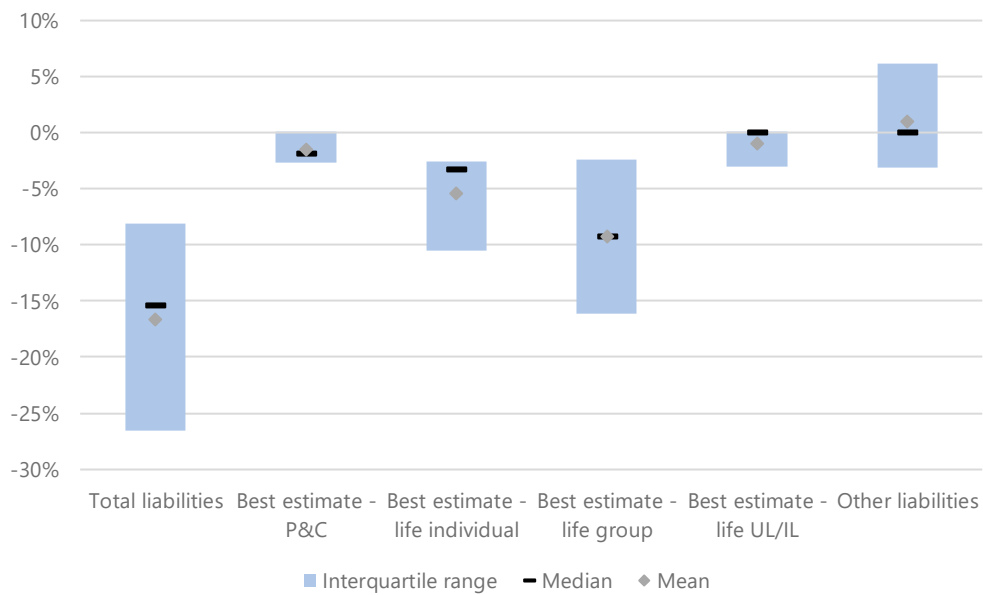
Source: IMF staff calculations based on company submissions.

Figure 4. Switzerland: Changes in the Value of Assets and Liabilities
(In percent)

Assets decline by an amount equivalent to 49 percent of risk-bearing capital. Most affected are fixed-income assets, real estate and equity holdings.

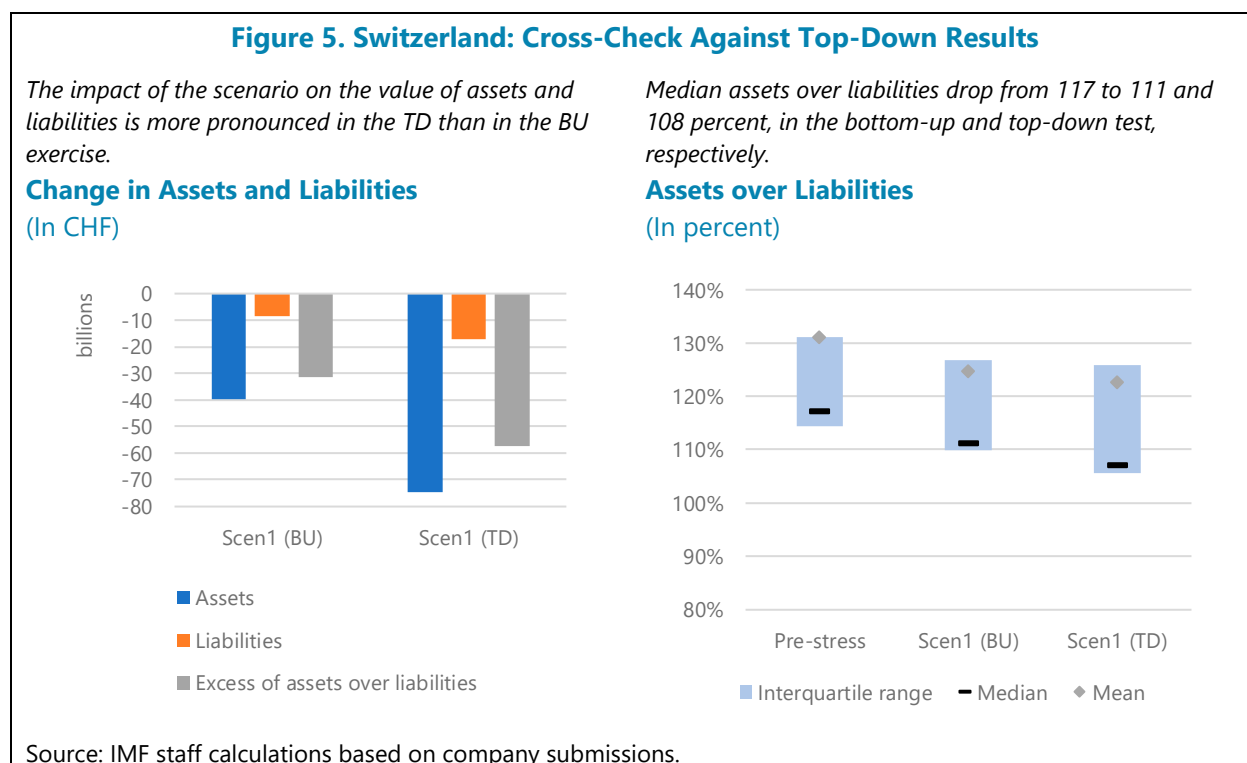


The fall in assets is partially compensated by a decline in liabilities, equivalent to 10 percent of risk-bearing capital.



Source: IMF staff calculations based on company submissions.

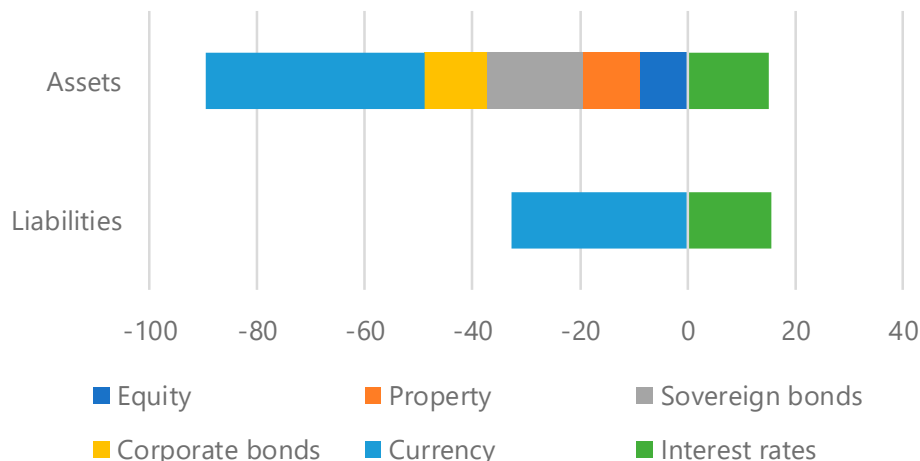
15. Top-down calculations confirm the findings from the bottom-up exercise. TD calculations cannot mirror the granularity of companies' own BU calculations. In particular, risk-mitigating mechanisms like financial hedging as well as options, guarantees and the loss-absorbing capacity of some life insurance contracts (risk-sharing with policyholders) can only be very roughly approximated. The TD stress test focused on the impact of the shocks on the valuation of assets and liabilities. For the median insurer, assets over liabilities drop from 117 percent before stress to 111 percent in the BU and to 108 percent in the TD exercise—also the dispersion in the sample is slightly larger in the TD model (Figure 5).



16. The main impact stems from higher credit spreads, as well as from the shocks to equity and real estate prices. The modular top-down calculations allow for a more granular attribution of the overall impact to individual shocks of the adverse scenario (Figure 6). Altogether, the excess of assets over liabilities declines by CHF 57 bn. The decline of assets by CHF 74 bn is partially compensated by lower liabilities. The largest net impact on the excess of assets over liabilities stems from the higher credit spreads for sovereign and corporate bonds (together 51 percent of the overall effect). Sizable effects can also be attributed to the real estate shock and the equity shock. The interest rate shock and the currency shock, both of which impact assets and liabilities alike, contribute considerably less, the interest rate shock being even slightly positive. In general, the stress is more pronounced for life business where bond investments have longer maturities and sensitivities to spread changes are accordingly higher. The impact from higher mortgage loan defaults is only marginal given rather low Loan-to-Value (LTV) ratios in current portfolios.

Figure 6. Switzerland: Contributions of Risk Factors in the Top-Down Model
(In CHF billions)

The largest net impact on the excess of assets over liabilities stems from the higher credit spreads for sovereign and corporate bonds. Sizable effects can also be attributed to the real estate shock and the equity shock.



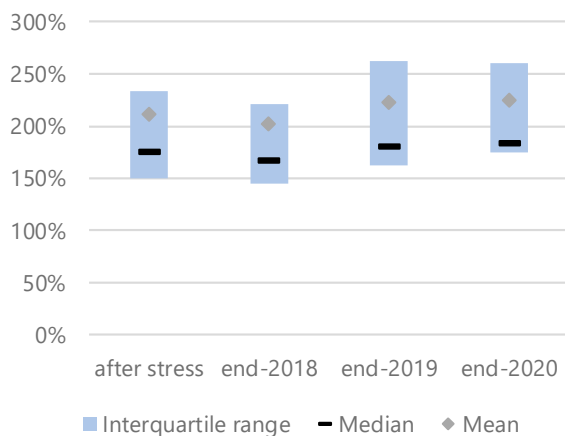
Source: IMF staff calculations based on company submissions.

17. Swiss insurers remain profitable after stress, even when assuming no recovery in asset prices, and solvency rates start improving gradually in the year following the stress.

Nevertheless, solvency ratios as projected by the companies improve in the years following the instantaneous stress, based on a solid underwriting business and favorable technical results. The median company would still experience a further slight decline in the SST ratio between the reference date at the end of June 2018 and the year-end, from 176 to 168 percent, but recover to a level of 184 percent two years later (Figure 7).

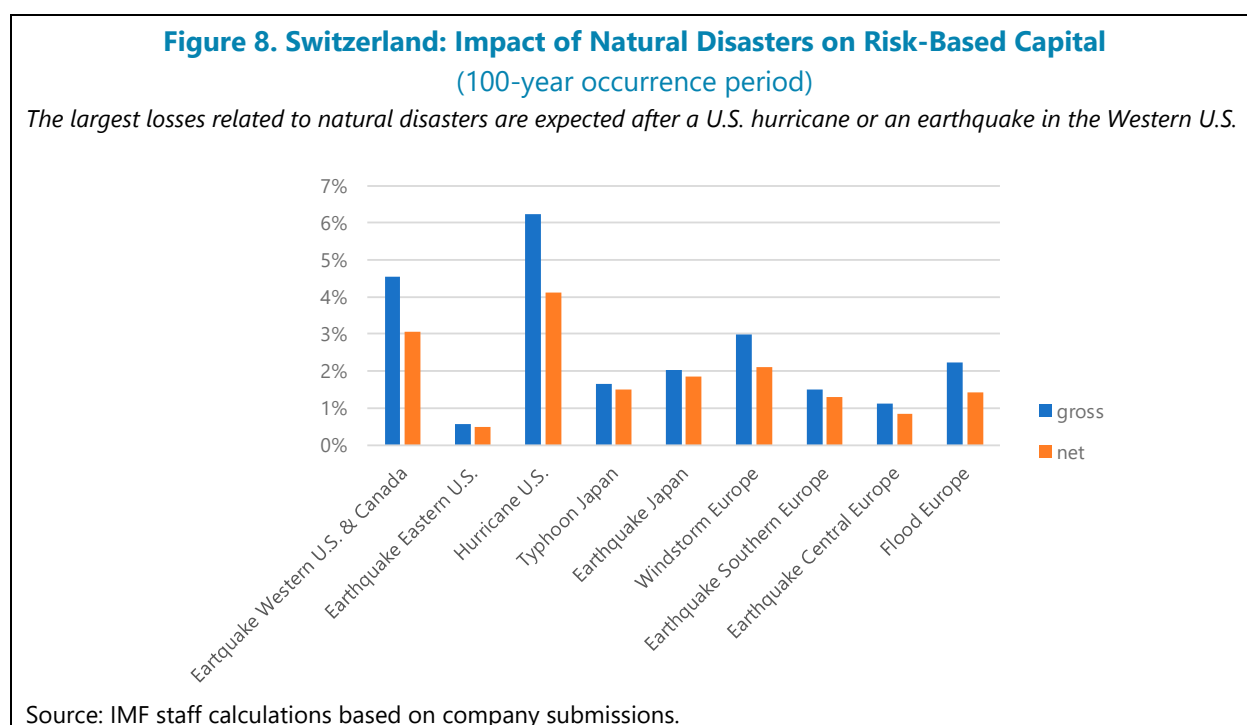
Figure 7. Switzerland: Solvency Projections
(In percent)

SST ratios are expected to improve slightly in the two years following the instantaneous shock.



Source: IMF staff calculations based on company submissions.

18. Swiss insurers are able to cope even with large natural disasters (Figure 8). Among the single-factor shocks tested were natural disasters for which detailed exposures are collected by FINMA as part of its annual SST assessment.³ The data shows that the largest losses could be expected after a U.S. hurricane or an earthquake in the Western U.S.—an event which can be expected every 100 years would cause gross losses (before reinsurance) of up to 6 percent of risk-bearing capital (4 percent after reinsurance). Even a 1-in-500-year event would reduce risk-bearing capital by only up to 12 percent before reinsurance coverage. Domestic catastrophe risks stem mostly from storms, floods and earthquakes. While these might have an impact on smaller insurers with a concentrated local exposure, the large groups would only be marginally affected.



19. Participating insurance groups have no concentrated exposures towards the Swiss G-SIBs. The single-factor analysis on the largest bank counterparty default provided insights into concentrated counterparty risks and the transmission channels of financial stress across sectors. Overall, the impact is minor, and the first-round impact of the largest banking counterparty's default reduces the median SST ratio only from 224 to 222 percent with no major dispersion across the sample.

20. Macrofinancial distortions caused by a simultaneous de-risking of the insurance sector are unlikely in the adverse scenario tested. The stress test assessed how companies are likely to restore their target solvency coverage and profitability levels after stress. As all companies remained well above the regulatory standard capital requirement of 100 percent SST coverage, the need for immediate management actions is very limited. In particular, companies do not see the need for a

³ Information on the impact of natural disasters was provided by ST participants with a material exposure.

major re-allocation of investment assets. Those companies that have reported a potential consideration of management actions indicated a de-risking of investment assets by selling equity and buying sovereign bonds—however, these transactions would be of limited size and unlikely to be rushed.

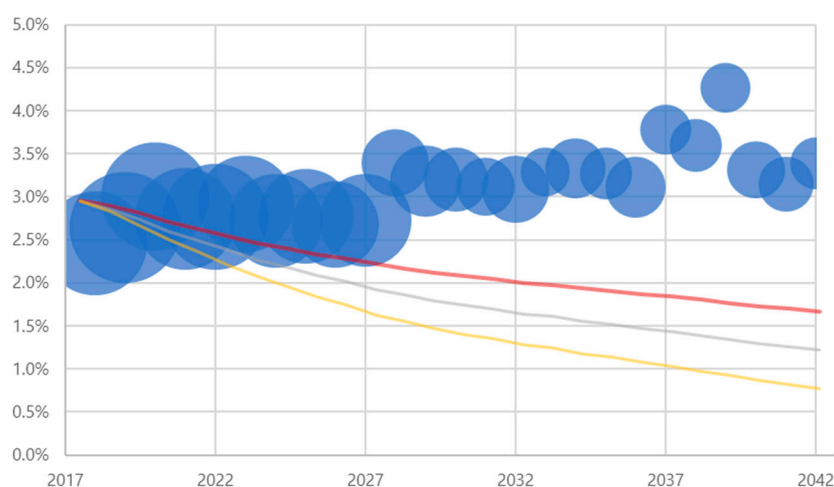
E. Challenges in a Prolonged Low-Yield Environment

21. Over a medium-term horizon, insurers are likely to face declining investment returns as higher-coupon bonds expire. The implementation of the SST has improved asset-liability matching. Accordingly, investment horizons have lengthened and reinvestment risks in the short term are limited: More than 50 percent of fixed-income investments will only expire after 2025, and for those the average coupon rate amounts to 3.1 percent. Nevertheless, projecting a roll-over of maturing bonds at constant future coupon of 1.0 percent will reduce the average coupon earned to 2.0 by the year 2027 (Figure 9).

22. On aggregate, participating groups still record positive spreads of investment returns over guaranteed interest rates, but significant differences exist across companies. Insurers expect their investment returns to decline even in the baseline scenario: From about 3.0 percent for the median company in 2015–17, to about 2.3 percent for 2018–20. While insurers which are more active in non-life and unit-linked life business are less affected and could sustain the current low-yield environment for a prolonged period, companies with a high stock of guarantees on their policies are likely to experience a drain on their profitability.

Figure 9. Switzerland: Maturity and Average Coupon Rate of Insurers' Fixed-Income Investments
(In percent)

Fixed-income investments are characterized by rather long maturities and high coupons—this reduces reinvestment risks in times of low interest rates, but cannot shield away completely from lower investment returns in the future.



Source: IMF staff calculations based on company submissions.

Notes: Each bubble represents the nominal value (size) and the coupon of fixed-income instruments expiring in a given year (ST participants only). The orange, grey and yellow lines show a projection of the average coupon, assuming that all maturing instruments are reinvested at a rate of 1.5, 1.0 and 0.5 percent, respectively.

F. Summary of Findings and Recommendations

23. FINMA should regularly conduct stress tests for large insurers, based on macrofinancial scenarios, and analyze insurers' potential for recovery after stress. Scenarios should reflect the current position in the financial cycle and comprehensively include all material risk factors. A forward-looking perspective should be established by analyzing the ability of insurers to reestablish their profitability and solvency position following the stress. Stress test results should also be used to challenge companies' Own Risk and Solvency Assessments (ORSA) and underlying projections for future business, specifically the expectations for premium growth and investment returns.

24. FINMA should closely monitor the credit spread and real estate exposures of insurers, including co-movements of risk factors and insurers' risk mitigation techniques. The stress test revealed significant sensitivities of insurers' risk-bearing capital against credit spread increases. The FSAP considers it important that FINMA follow up on those findings. With regard to real estate exposures, FINMA should also consider potential concentration risks, in particular for insurers which also invest in mortgages, and implications for liquidity.

Table 3. Switzerland: Financial Soundness Indicators of the Insurance Sector
(In percent)

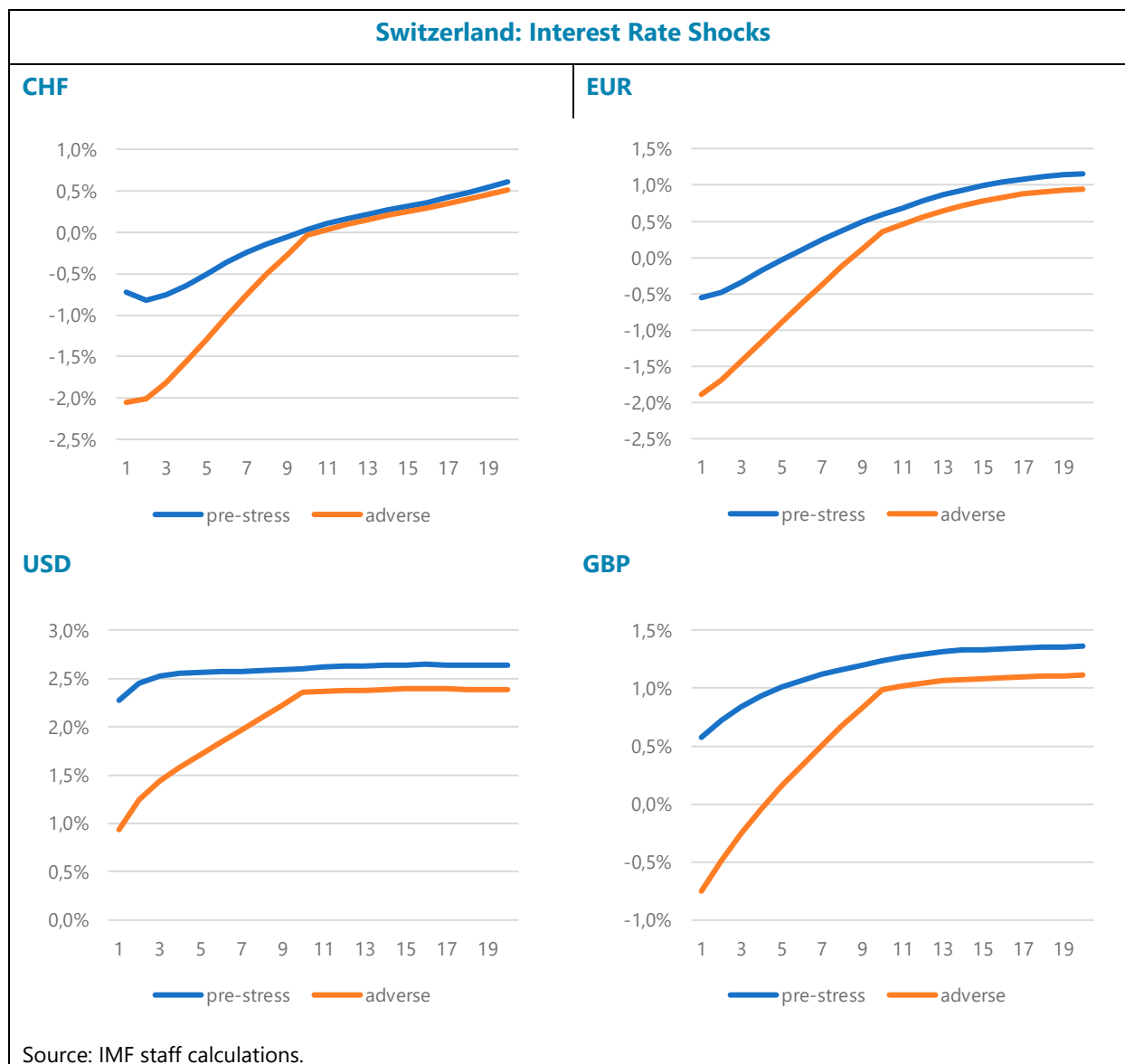
	2013	2014	2015	2016	2017
Capital adequacy					
Shareholder equity and reserves / total assets - life	7.7	...	7.4	...	7.3
Shareholder equity and reserves / total assets - non-life	29.0	...	29.2	...	25.7
Shareholder equity and reserves / total assets - reinsurance	24.9	...	26.6	...	17.8
Solvency coverage ratio (SST) - life	153	149	147	160	178
Solvency coverage ratio (SST) - non-life	203	191	201	228	231
Solvency coverage ratio (SST) - reinsurance	219	204	199	217	220
Profitability					
Growth in gross written premiums - life	...	-0.7	-0.4	-5.7	-3.7
Growth in gross written premiums - non-life	...	-2.1	-2.7	1.9	2.7
Growth in gross written premiums - non-life	...	6.5	4.2	26.7	-3.7
Loss ratio (net paid claims / net premiums) - non-life	56.6	59.3	60.8	57.3	58.8
Loss ratio (net paid claims / net premiums) - reinsurance	66.9	61.7	60.6	64.6	75.4
Expense ratio (net expenses / net premiums) - non-life	24.9	27.5	29.2	28.9	29.3
Expense ratio (net expenses / net premiums) - reinsurance	25.2	30.0	31.6	33.7	35.8
Combined ratio (loss ratio plus expense ratio) - non-life	81.5	86.8	90.0	86.2	88.1
Combined ratio (loss ratio plus expense ratio) - reinsurance	92.0	91.7	92.2	98.3	111.2
Return on equity - life	9.9	7.8	6.6	6.7	8.5
Return on equity - non-life	19.6	18.3	14.9	17.8	13.7
Return on equity - reinsurance	15.7	16.3	27.8	9.0	2.4
Asset quality					
Bonds / total investments excl. unit-linked	46.3	...	44.2	...	40.4
Stocks / total investments excl. unit-linked	3.0	...	3.8	...	4.0
Investment yield - life	3.3	3.3	3.1	2.9	2.5
Liquidity					
Liquid assets / total investments excl. unit-linked ¹	53.8	...	53.4	...	50.8
Reinsurance					
Risk retention ratio (net premium / gross premium) - life	99.1	99.2	99.1	98.8	98.6
Risk retention ratio (net premium / gross premium) - non-life	87.5	87.7	87.2	88.8	87.3

Source: IMF staff calculations based on FINMA data.

Notes: Reinsurance includes captives.

¹ Liquid assets include bonds, equity, cash and deposits, and investment funds.

Appendix I. Insurance Sector Stress Test—Interest Rate Shocks



INSURANCE SECTOR: SOLVENCY RISK			
Domain		Framework	
		BU by Insurance Undertakings	TD by IMF
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> • Six insurance groups 	
	Market share	<ul style="list-style-type: none"> • Life: 56 percent of domestic premiums • Non-life: 45 percent of domestic premiums 	
	Data	<ul style="list-style-type: none"> • Companies' own data • FINMA regulatory reporting 	<ul style="list-style-type: none"> • Companies' own data from bottom-up stress test • FINMA regulatory reporting
	Reference date	<ul style="list-style-type: none"> • June 30, 2018 • December 31, 2017 for natural catastrophe shocks 	<ul style="list-style-type: none"> • June 30, 2018
2. Channels of risk propagation	Methodology	<ul style="list-style-type: none"> • Investment assets: market value changes after price shocks, affecting the solvency position • Sensitivity analysis: effect on available capital and solvency position. 	<ul style="list-style-type: none"> • Investment assets: market value changes after price shocks, affecting the value of assets and liabilities • Sensitivity analysis: effect on value of assets and liabilities.
	Time horizon	<ul style="list-style-type: none"> • Instantaneous shock • 3-year projections 	<ul style="list-style-type: none"> • Instantaneous shock
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> • Macrofinancial scenario broadly in line with the banking sector stress test (see above) • Adverse scenario: CHF policy rate declining by 133 bps, CHF sovereign yield curve steepening (+4 bps for 1y and +130 bps for 10y); sovereign spread shocks for other advanced economies between +92 bps and +184 bps (for high-yield EUR economies); stock prices -23.4 percent (Switzerland), -29.6 percent (for other advanced economies), private equity -15.0 percent, hedge funds -10.0 percent; domestic property prices between -18.5 percent (residential) and -22.2 percent (commercial), foreign property prices between -6.3 percent (residential) and -7.6 percent (commercial); corporate bond spreads of non-financials between +50 bps (AAA) and +350 bps (B and lower), and for financials between +70 bps (AAA) and +465 bps (B and lower); appreciation of CHF against major currencies 	
3. Tail shocks	Sensitivity analysis	<ul style="list-style-type: none"> • Default of largest banking counterparty • Natural catastrophes: U.S. earthquake, U.S. hurricane, Japan typhoon, Japan earthquake, Europe windstorm, Europe earthquake, Europe flood; each independently, model output calibrated at a 100-year return period 	<ul style="list-style-type: none"> • None
4. Risks and buffers	Risks/factors assessed	<ul style="list-style-type: none"> • Market risks: interest rates, share prices, property prices, credit spreads 	<ul style="list-style-type: none"> • Market risks: interest rates, share prices, property prices, credit spreads

INSURANCE SECTOR: SOLVENCY RISK			
Domain		Framework	
		BU by Insurance Undertakings	TD by IMF
		<ul style="list-style-type: none"> • Credit risks: default of largest financial counterparty • Underwriting risks: catastrophic events • Summation of risks, no diversification effects. 	<ul style="list-style-type: none"> • Summation of risks, no diversification effects.
	Buffers	<ul style="list-style-type: none"> • Product-specific 	<ul style="list-style-type: none"> • None
	Behavioral adjustments	<ul style="list-style-type: none"> • Management actions limited to non-discretionary rules in place at the reference date. 	<ul style="list-style-type: none"> • None
5. Regulatory standards and parameters	Regulatory/accounting standards	<ul style="list-style-type: none"> • Swiss Solvency Test • National GAAP, IFRS, US-GAAP 	
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> • Impact on solvency ratios • Impact on net income • Contribution of individual shocks • Dispersion measures of solvency ratios and net income. 	<ul style="list-style-type: none"> • Impact on assets over liabilities • Contribution of individual shocks • Dispersion measures of assets over liabilities