

Swiss pension system under stress

Application of the EIOPA stress test 2019 to the Swiss occupational pension system

Authors: Dr. Jan Koller
Jovana Janjusic
Dr. Marc Rüdlinger

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List of abbreviations

BFS	<i>Bundesamt für Statistik</i>
CBS	<i>Common balance sheet</i>
DB	<i>defined benefit plan</i>
DC	<i>defined contribution plan</i>
EAL	<i>Excess of Assets over Liabilities</i>
ECB	<i>European Central Bank</i>
EEA	<i>European Economic Area</i>
EIOPA	<i>European Insurance and Occupational Pensions Authority</i>
ESRB	<i>European Systemic Risk Board</i>
EU	<i>European Union</i>
GDP	<i>Gross domestic product</i>
HY	<i>hybrid plan</i>
IORP	<i>Institutions for Occupational Retirement Provisions</i>
NBS	<i>National balance sheet</i>

1 Introduction

1.1 Background: EIOPA's stress tests

With approximately 4 trillion Euros of assets under management (as at year-end 2018), European pension providers make up approximately 20% of the euro area GDP (ECB, 2020). This makes the pension sector a systemically relevant factor. The European Insurance and Occupational Pensions Authority (EIOPA) supervises Institutions for Occupational Retirement Provision (IORPs) in the European Union (EU). For regulatory purposes, EIOPA and the European Systemic Risk Board have designed a specific stress test to assess the resilience of the IORPs to adverse market scenarios and the implied systemic risk. In 2015, the first stress test was conducted, followed by further stress tests in 2017 and 2019.

EIOPA and stress tests

176 IORPs from 20 countries within the European Economic Area (EEA) participated in the 2019 exercise, covering both defined benefit/hybrid (DB/HY) and defined contribution (DC) plans. In each country, the national supervisory authority selected a representative sample of participating IORPs covering more than 60% of the total pension assets. The IORPs themselves conducted the exercise and provided their results to the national supervisory authority which, after validation, submitted them to EIOPA.¹

Stress Test 2019

The adverse market scenario in the 2019 stress test exercise included a sudden reassessment of risk premia and an increase in yield curves, leading to an instantaneous and permanent drop in asset prices by the end of 2018. Moreover, the 2019 stress test was supposed to identify second-round effects on sponsors, plan members and beneficiaries. In addition, IORPs' investment behavior and the integration of ESG factors in their investments was analyzed.²

Adverse market scenario 2019

¹ EIOPA, 2019b.

² EIOPA, 2019b.

The main results of the 2019 stress test are the following:³

Main results 2019

- The adverse scenario would have reduced the assets by 250 billion Euros in the DB sector and 16 billion Euros in the DC sector leading to aggregate deficits of 180 billion Euros according to national methodologies and 216 billion Euros according to the common methodology, respectively.⁴
- Applying the common methodology, these deficits would have led to aggregate benefit reductions of 173 billion Euros and financial support by the sponsor of 49 billion Euros.

1.2 Motivation and goals of this study

In Switzerland, IORPs' asset under management at year-end 2018 was CHF 1'022bn,⁵ including full insurance assets of CHF 147bn.⁶ With 142% of the GDP, this number is far above the EU average of 20%.⁷ Despite the sector's financial relevance, there is no mandatory stress test for Swiss pension funds. The Occupational Pension Supervisory Commission (OAK BV) in Switzerland publishes a yearly review on the financial situation of Swiss pension funds. However, this review does not include anything comparable to EIOPA's stress test exercises. This is despite the fact that the same challenges exist in Switzerland as in Europe. The following section briefly summarizes these challenges.

No stress test in Switzerland

The developments in the private pension sector influence the financial stability of the IORPs. Firstly, demographic changes, the low yield environment and high volatility in stock markets challenge the financial stability of the IORPs, demanding to test the IORPs' resilience. Secondly, the private pension sector no longer exclusively supplies the market with traditional DB schemes but provides more DC schemes. Given this development, the private pension sector moves away from pension protection schemes and sponsor support to benefit reduction in case of an adverse market scenario. Consequently, the financial risks rather lie with the plan participants of the IORPs than with the IORPs themselves.⁸

Challenges / motivation for a stress test

Swiss IORPs share these challenges with their European counterparts. First, due to the demographic changes and the low yield environment, Swiss IORPs struggle with the height of the mandatory conversion rate, which has put a strain on the financial stability in the medium and long-term. Second, the shift of investment risk towards plan participants in the Swiss pension sector is present as well. As of 2019, almost all (95%) plan participants are insured in hybrid plans close to defined contribution plans.⁹

³ EIOPA, 2019b, p. 4.

⁴ See chapter 2 for the methodologies.

Given the challenges in Switzerland and the high public interest for a stress test, we apply the EIOPA stress test to the Swiss pension sector. The main goals of this study are the following: Goals

- identify the resilience of Swiss pensions funds to shifts on the financial markets;
- determine to what extent the risks are born by the employee, the employer, and other parties, respectively;
- compare the results to those in EIOPA's stress test exercise 2019;
- gain insights regarding the feasibility of conducting such a stress test in Switzerland on a mandatory basis.

⁵ OAK BV, 2018, p. 10-12

⁶ Bundesamt für Statistik (BFS), 2020b, p. 18.

⁷ Bundesamt für Statistik (BFS), 2020a.

⁸ EIOPA, 2019b.

⁹ Bundesamt für Statistik (BFS), 2021.

2 EIOPA stress test 2019 methodology

2.1 Overview

To assess the resilience of the IORPs, EIOPA defines an *adverse market scenario* (financial market shock). The adverse market scenario considers three current pension sector challenges: First, low interest rates and a general low yield environment require the IORP to hold higher technical provisions. Second, continuous increases in life expectancy further increase liabilities in the balance sheets. Third, high volatility in the global stock markets increase risk on the investments and thus increase the pressure on funding ratios.¹⁰ The adverse market scenario will be discussed in more detail in section 2.2.

Adverse market scenario

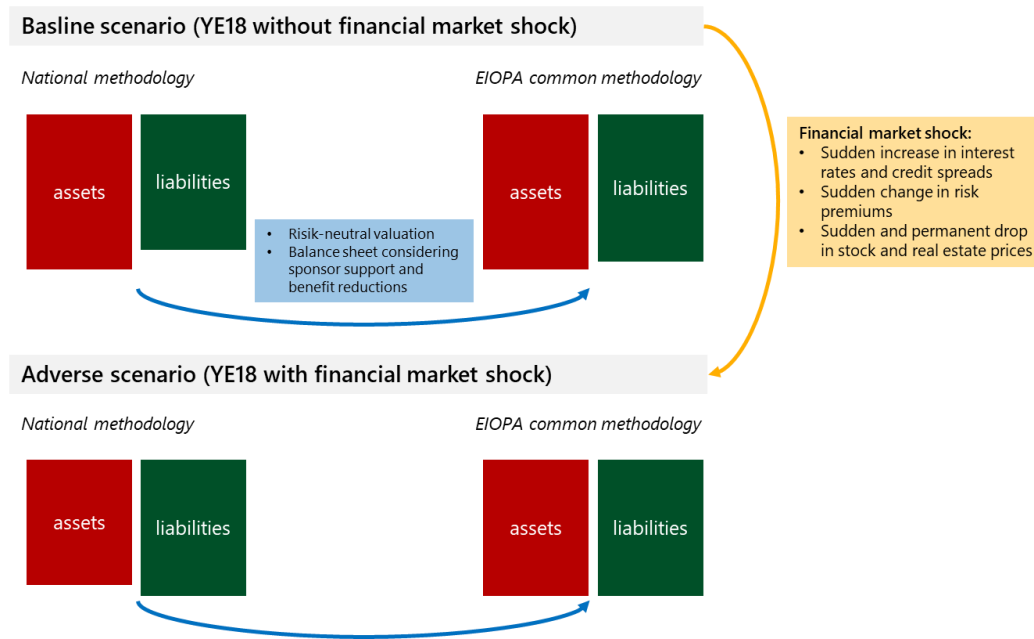
One of the main requirements of the stress test is to allow for a cross-country comparison. Therefore, the initial situation and the impact of the adverse scenario must be assessed by the same valuation standards. To achieve this comparability, EIOPA developed a common valuation and accounting methodology. Each IORP reports its financial funding status based on the national regulatory framework – the national balance sheet (NBS) – as well as the common methodology defined by the EIOPA. The result of the application of the common methodology is called common balance sheet (CBS). To understand and interpret the stresstest results, it is crucial to understand the principles and specifications of the common methodology. It is therefore explained in detail in section 2.3.

Common valuation methodology

The following figure illustrates the stress test, which consists of its basic elements *common methodology* and *adverse scenario*.

¹⁰ EIOPA, 2019b, p. 3.

Figure 1: Stress test approach (schematic illustration)



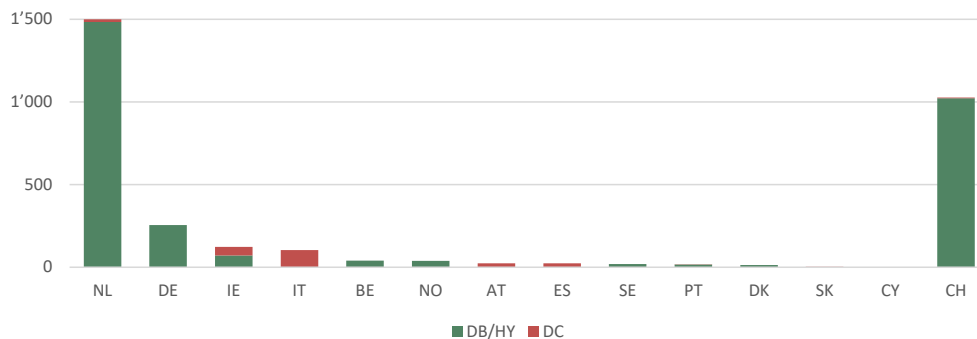
Source: Own figure based on EIOPA stress test 2019 specifications.

EIOPA’s stress test report 2019 makes a conceptual distinction between defined contribution schemes (DB) and defined benefit/hybrid schemes (DB/HY). Since the liability reduction in a DC scheme is (by definition) identical to the reduction of the assets, the common methodology is only relevant for DB/HY plans, where the liabilities (and the assets as well) depend on the specific valuation methodology.

DC vs. DB plans

The following figure shows the relevance of DB/HY vs. DC assets by country. It reveals two important facts. First, the Dutch and the Swiss pension systems are dominating in terms of total pension assets among the countries considered.¹¹ Second, although the assets in DC schemes are dominant in some individual countries, the overall importance is very low.

Figure 2: Total assets by country and pension scheme, in bn CHF



Source: European countries: EIOPA 2019b; Switzerland: OAK BV, 2018, p. 10-12 and Bundesamt für Statistik (BFS), 2020b, p. 18, 46.

Since the main purpose of this study is the application of the stress test to the Swiss pension system, where DB/HY plans make up the overwhelming majority, we do not take DC assets into account.

Schemes considered in this study

2.2 Adverse market scenario

The European Central Bank (ECB) and the European Systemic Risk Board (ESRB) have defined an adverse market scenario, which takes the recent financial market and macroeconomic developments into account. As the IORP stress test report 2019 uses December 31st, 2018 as its reference date, the adverse market scenario reflects developments up to this date.¹²

Overview

The adverse market scenario is assumed to realize instantaneously at year-end 2018, i.e., all adjustments happen without any lag or transition period. The stress test 2019 includes detailed specifications concerning the changes of the risk-free term structure, the changes in the governmental and corporate bond yields as well as the instantaneous and permanent declines in stock and real estate prices. The adverse market scenario specifications can be summarized as follows:¹³

Specifications

- increase of government bond yields between 0.3% and 4.2% (dependent on currency and maturity);
- increase of credit spreads (corporate bonds);
- immediate and permanent drop in stock prices between 38% and 46% (dependent on region);
- immediate and permanent drop in real estate prices between 20% and 38% (dependent on region).

¹¹ Note that the countries considered are those participating in EIOPA's stress test 2019 study (which did not include UK due to the Brexit) and Switzerland. In addition, only IORPs relevant for EIOPA supervision are shown in the chart.

¹² EIOPA, 2019b, p. 9-10.

¹³ See EIOPA 2019c, p. 41-46.

2.3 Common methodology

The common methodology basically consists of two steps:¹⁴

Overview

1. Projection of future benefits and contributions based on the national balance sheet. For instance, in some countries, the level of the funding ratio (based on the NBS), is relevant for the adjustment of benefits and contributions. The projection can be “open”, i.e., on an ongoing concern basis, if the NBS depends on entries and exits in the future.
2. Risk neutral valuation of benefits paid to the current beneficiaries and contributions paid to finance these benefits. Contributions particularly include payments for recovery in case of a funding deficit required by the respective national regulation. In the “open modelling” context described above, it is important to note that payments made for future employees are also considered if they do not serve as accrued benefits for future employees.

The stress test specification by EIOPA is only a methodological framework. It does not include a detailed implementation guide on the national level. The specification documents do explicitly state that already established methods concerning risk neutral valuation on a national level should be applied.

National application

¹⁴ Sources: EIOPA 2019c, p.16-18 and EIOPA 2019a.

3 Model for the Swiss pension system

3.1 Common methodology for Swiss pension funds

The Swiss occupational pension system mainly consists of defined contribution schemes with guarantees. These schemes are typical *hybrid* schemes which require the application of the common methodology. In the following, we shortly characterize the most important guarantees in the old age benefits of the Swiss pension system:

Short explanation
of Swiss pension
system

- In case of underfunding, the plan sponsor (employer) and the members (employees) must pay additional "recovery contributions".
- There is a guaranteed, minimum interest rate on the savings account. For pension plans which only cover the minimum/mandatory benefits, the guaranteed interest rate corresponds to 0.5% in 2021.¹⁵ For pension plans that cover benefits above the minimum, the guaranteed interest rate corresponds to 0.0%.¹⁶
- At retirement age, the employees savings account is converted into a lifelong annuity using a conversion rate. For pension plans which only cover the minimum/mandatory benefits, the guaranteed conversion rate is 6.8%. For pension plans above the minimum, the conversion rate can be reduced.

The guarantees in the Swiss pensions system are all based on the mandatory minimal pension plan. However, the minimal pension plan is undermined in various ways:

Soft guarantees

- Collective pension foundations: often, no minimal plans are offered. Consequently, benefits are financed by higher contributions of the plan members and the sponsor.
- In many cases, contributions are used to finance excessive conversion rates (e.g., by cross-subsidization via contributions for risk benefits)
- Recovery contributions paid by active plan participants and the sponsor in case of underfunding.
- Variable annuity models distinguish between guaranteed and variable annuity parts.
- Minimum interest rate is only a temporary guarantee, since it can be adjusted by Swiss government. From 2002 until 2017 it was reduced from 4.0% to 1.0%, following the decreasing market interest rates.
- Ultimately, the minimum conversion rate and further parameters can be adjusted in the legislative process.

Consequently, the guarantees in the Swiss pension system are "soft guarantees", i.e., in the extreme case, they are softened substantially. In addition, the provided pension schemes adjust slowly but steadily to the financial market conditions.

Swiss IORPs are obliged to apply the accounting standard Swiss GAAP FER 26 for their national balance sheets. The assets are valued on a market basis. The liabilities (actuarial reserves for annuities and technical provisions), however, are discounted by a technical interest rate which is typically higher than the risk-free interest rate.¹⁷ The regulatory environment is based on the ongoing concern principle. This is reflected, for example, in the fact that a temporary underfunding of the pension fund is allowed under the condition that recovery is possible within a certain time period, applying recovery measures explicitly stipulated by the law. The liability of the active plan participants mainly consists of the savings acquired during their membership. Benefit improvements and reductions as well as recovery measures typically occur on a discretionary basis and are not accounted for in the balance sheet.

National Accounting

Risk neutral valuation as specified by EIOPA, is very uncommon for Swiss pension funds. The main reason is that an ongoing concern perspective differs fundamentally from EIOPA's solvency perspective. Moreover, the application of a sophisticated risk neutral valuation procedure would cause an extraordinary financial burden for small and medium sized pension funds in Switzerland.

Risk neutral valuation

The following table gives a high-level comparison of the Swiss national methodology (Swiss Gaap FER 26) and the EIOPA common methodology/risk neutral valuation.

Figure 3: Comparison between national (Swiss) and common methodology

	National methodology (FER 26)	EIOPA common methodology
Accounting perspective	ongoing concern	solvency
Provisions active insureds	individual savings accounts	risk-neutral valuation of future benefits including benefit reductions
Provisions retirees	actuarial basis / technical interest rate	risk-neutral valuation of future benefits
Other technical provisions	technical provisions with partly going concern assumption	no
Plan assets	available plan assets on market basis	available plan assets (on market basis) + risk-neutral valuation of future sponsor support

Source: Own figure based on EIOPA's common methodology specifications and the accounting standard for Swiss pension funds (Swiss Gaap FER 26).

¹⁵ The minimum interest rate as of 2021 is 1%, but a reduction to 0.5% is possible as a recovery measure. (Art. 15 Abs. 2 BVG, Art. 12 BVV2, Art. 65d Abs. 4 BVG). However, going below the minimum interest rate must be justified by a strong underfunding that cannot be eliminated by other measures.

¹⁶ In case of underfunding, the interest rate can be reduced to 0.0% overall without falling below the minimal interest rate requirement on the mandatory part of the savings account.

¹⁷ In 2018, the average technical interest rate was around 2% (BFS, 2020b, p. 23).

A special case within the pension schemes in Switzerland is the full insurance scheme. Since the ultimate contractor of a pension scheme must by law always be a pension foundation, the scheme is set up as a foundation which is fully insured by an insurance company bearing all relevant risks. The asset side of the balance sheet mainly consists of an item "assets from insurance contract", which is always equal to the liabilities. Therefore, the foundation, or pension fund, respectively, is always fully funded. It will be shown in the next sections how the full insurance schemes will be treated in the stress test exercise.

Special case: full insurance scheme

3.2 Approach and data

In EIOPA's study, the aggregate results of each country are the sum of the individual results of the participating IORPs. In this study, the approach is different: we create a representative Swiss pension fund and then make one projection using a representative model. This model has two important advantages. First, the representative pension fund is based on aggregate data covering (almost) 100% of the Swiss pension system. Second, only few participating pension funds are required to calibrate the representative model and verify the results.

A simple approach for this study

The data basis of this study is twofold:

Data basis

- publicly available aggregate data;
- a proprietary pension fund database (c-alm Peergroup database).

The publicly available aggregate data mainly consists of *BFS Pensionskassenstudie 2018*¹⁸ as well as the *review on the financial situation of Swiss pension funds 2018*¹⁹. They include aggregate assets and liabilities and average benefit parameters. The following table summarizes the data basis which was used to create the representative Swiss pension funds. In this table, we distinguish between non full insurance schemes (= autonomous/partially autonomous) and full insurance schemes. This distinction is important since the full insurance scheme is supposed to be always fully funded (100% funding ratio) and unaffected by the adverse market scenario.

¹⁸ Bundesamt für Statistik (BFS), 2020b.

¹⁹ OAK BV, 2018.

Figure 4: Summary statistics of Swiss pension funds by insurance coverage

	no full insurance	full insurance	weighted
Number of pension funds	1'443	106	1'549
Total assets in mio. CHF	774'958	147'162	922'120
Funding ratio	105.5%	100.0%	104.6%

Source: OAK BV, 2018, p. 10-12 and Bundesamt für Statistik (BFS), 2020b, p. 18. Note that the data for pension funds with state guarantee (partially capitalized funds) was excluded. The actuarial calculations of the obligations are based on the technical principles BVG 2015, generation table, with a technical interest rate of 2.10%.²⁰

For the representative pension fund, we combine all 1'549 IORPs into one pension fund, incorporating approximately 0.8 million pensioners and 2.9 million active plan participants.²¹

3.3 Model data and parameters

The representative model of the Swiss pension fund requires data for the current situation as well as parameters for the projection of the pension fund. The following table summarizes the data and parameters used for the baseline and the adverse scenario.

Most important assumptions

Figure 5: Summary of data and parameters

Parameter / Data	Source	Baseline scenario	Adverse scenario
Active plan participants	- Swiss working population: BFS (2018) - Scaling factor 2 nd pillar: OAK (2018)	Swiss working population by age * scaling factor 2 nd pillar	
Retirees	- Swiss population: BFS (2018) - Scaling factor 2 nd pillar: OAK (2018)	Swiss population by age * scaling factor 2 nd pillar	
Salaries	Gross wage median: BFS (2018)	Gross wage median * distribution of active insured persons	
Ordinary contributions	BFS (2018) and own calculations	25+: 12%; 35+: 15%; 45+: 19%; 55+: 21%	
Lump sum payment at retirement	Estimated based on legal minimum (Art. 37 Abs. 2 BVG) and c-alm Peergroup database	25%	
Actuarial basis	OAK BV (2018)	BVG 2015 Technical interest rate: 2.1%	BVG 2015 Technical interest rate: 2.2%
Asset allocation	CS-PK-Index augmented by c-alm Peergroup database	see figure (asset allocation of DB/HY plans)	
Conversion rate	c-alm Peergroup database	Depending on the funding ratio: - Conversion rate: from 4.7% up to 5.5%	
Interest rate on savings accounts	c-alm Peergroup database	- Interest rate on savings account: from 0% up to 3.75%	
Recovery measures	c-alm Peergroup database	- Recovery contributions: from 0.75% up to 12% (employer's share: 50%)	

Source: Own figure.

The conditional performance and recovery plan refers to the benefit adjustments and recovery measures conditional on the financial situation of the pension fund. The conditional benefit and recovery mechanism is approximated by using representative schemes from the c-alm Peergroup database.

3.4 Valuation

The valuation procedure for the non-full-insurance schemes consists of the following steps:

Non-full-insurance

Step 1: Projection of all future cashflows (benefits and recovery contributions) of the current retirees and active plan participants in a stochastic model. The parameters used in this model are as follows:

- *Benefits/recovery measures:* as described in the last section, depending on the statutory funding ratio
- *Expected return:* risk-free rate
- *Volatility:* historic (10y) volatility based on the risky portfolio (asset allocation)

Step 2: Discounting the future cashflows using the risk-free interest rate.

This simplified approach delivers a risk-neutral valuation in order to determine the items required in the common balance sheet.

As mentioned above, the full insurance scheme is assumed to be fully funded (100% funding ratio) in the baseline as well as the adverse scenario. This assumption applies to both the national as well as the common methodology. It means that there is no underlying investment risk and there is no downside or upside risk for the sponsor and the plan members. In the common methodology, this is a simplification. A downside impact is possible but unlikely in the case of a default of the insurance company. An upside/benefit improvement is possible since the full insurance contract is subject to a regulation that requires the payment of surpluses above a certain limit.²²

Full-insurance schemes

²⁰ OAK BV, 2018, p. 6.

²¹ Bundesamt für Statistik, 2020b, p. 7.

²² This is denoted "legal quote" and is regulated in the insurance supervision law ("Versicherungsaufsichtsgesetz, VAG).

4 Results and cross-country comparison

4.1 Introduction

In this chapter, we present the stress test results for Switzerland and compare them to the countries that participated in the EIOPA stress test 2019. The main result of the stress test clearly refers to the question how the portfolios of a country's IORPs were affected by the adverse market scenario and how pension systems absorbed the shock. As mentioned in the preceding section, the cross-country comparison is only feasible under the common methodology. Before presenting these results, however, we first demonstrate differences between the national and common methodology for each country in the baseline scenario.

Switzerland

4.2 Baseline scenario: national vs. common methodology

4.2.1 Funding ratio

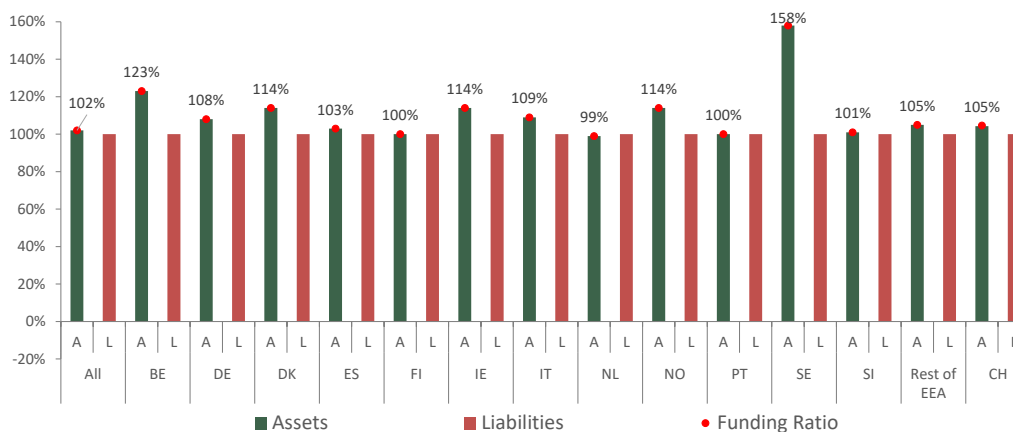
In the national methodology, Switzerland's IORPs have an average funding ratio of 104.6% which implies an excess of assets over liabilities (EAL) of CHF 39bn.²³

Switzerland

The following exhibit shows the funding ratios based on the national balance sheet as well as the assets and pension liabilities. In every country, the average funding ratio is above 100% except for the Netherlands. The average funding ratio excluding Switzerland's IORPs is 102%.²⁴

International comparison

Figure 6: Funding ratios based on national methodology



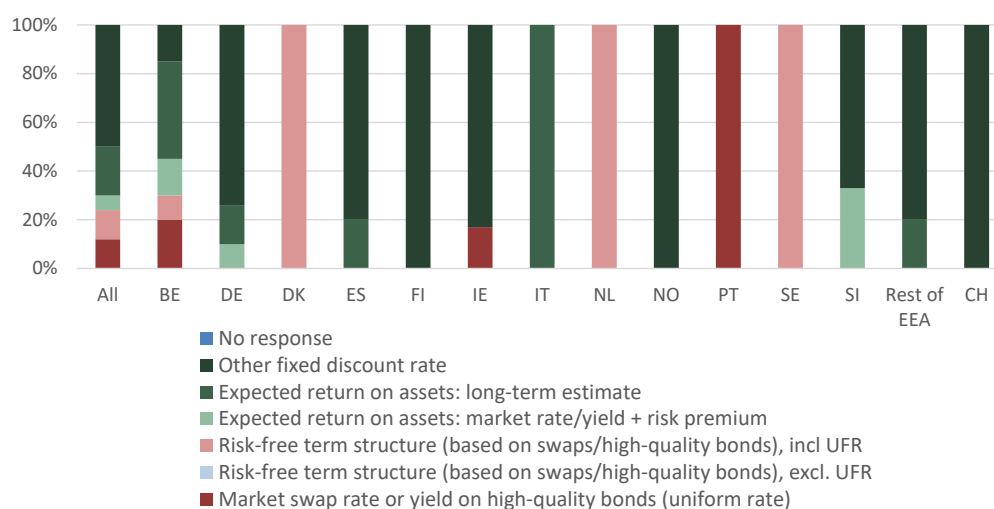
Source: European countries: EIOPA 2019b; Switzerland: own calculations.

Note: "All" does not include Switzerland.

4.2.2 National liability valuation

In all national methodologies (accounting standards), the IORPs' liabilities reflect the present value of anticipated future cash outflows. However, differences between national methodologies exist; especially in terms of which future cash flows are considered and regarding the discount factor. The variety of the valuation approaches for the liabilities is wide. In the EIOPA stress test study 2019, IORPs were surveyed regarding the discount rate applied to determine the present value. The following figure shows the result of this survey concerning the methodology to determine the discount rate.²⁵

Figure 7: Comparison of discount rate determination method for liability valuation



Source: European countries: EIOPA 2019b; Switzerland: own assessment.

Note: "All" does not include Switzerland.

It is apparent that in only a few countries IORPs apply a risk-free term structure, while the most common discount rate is fixed and/or depends on the expected return on assets. In Switzerland, the liabilities are discounted by a technical interest rate. Depending on the structure of the pension fund (e.g., share of the pensioners in terms of liabilities), the regulation allows for a discount rate above the risk-free interest rate.²⁶

As the following figure illustrates, the actual discount rate does not only depend on the method applied but also on the country-specific interest rate level.

²³ Own calculation based on OAK BV, 2018, p. 11.

²⁴ EIOPA, 2019b, p. 16.

²⁵ EIOPA, 2019b, p. 17.

²⁶ SKPE, 2019.

Figure 8: Average discount rate and comparison to risk-free rate



Source: European countries: EIOPA 2019b; Switzerland: OAK BV, 2018, p. 11 and SNB, 2021.

Note: "All" does not include Switzerland.

The Europe-wide average national discount rate applied in 2018 was 1.7%. It lies, on average, 0.5%-points over the average risk-free rate of 1.2%.²⁷ However, there is substantial variation in the level ranging from 1.3% to 4.1%. In Switzerland, the average discount rate in 2018 was approximately 2.1%. Compared to the risk-free rate of -0.1%, there is a mark-up of 2.2%-points.

Without further inspection of national methodologies, it is obvious that the differences in discount rates would – for identical benefits – lead to different liabilities and different funding ratios. A first step towards more comparability would be to apply the same method to determine the discount rate. However, this would not solve the comparability issue, since the liability is also affected by *what* is considered as a benefit. This is especially a challenge in the case of conditional benefits. For the purpose of maximum comparability, we no switch to the common methodology view as explained in the last chapter.

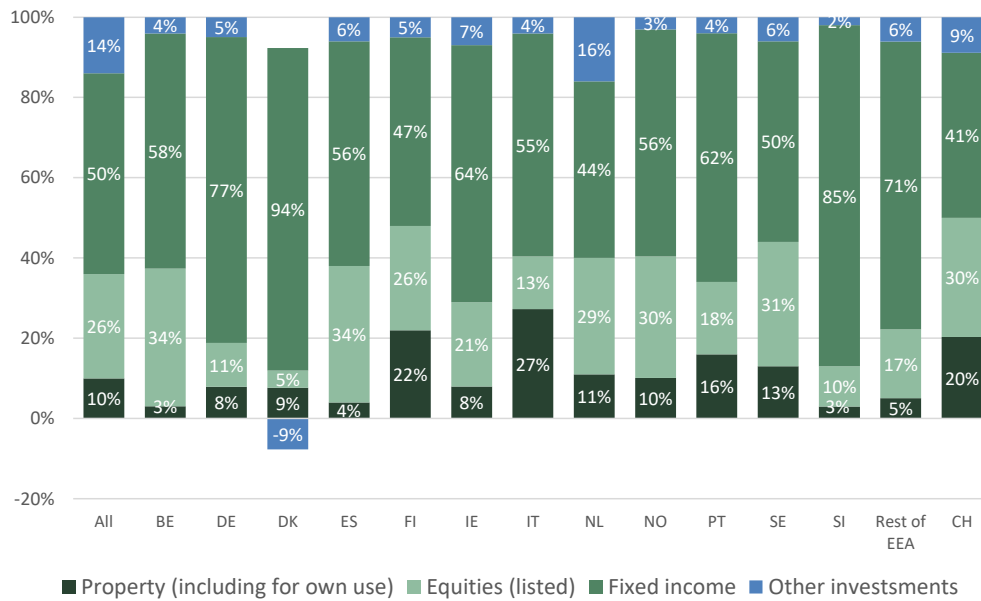
²⁷ EIOPA, 2019b, p. 17.

4.2.3 Common methodology

4.2.3.1 Asset allocation

An important factor concerning the effect of the adverse scenario is the asset allocation of the IORPs. The international comparison is presented directly under the title “common methodology” since the overwhelming part of the assets, in every country, already corresponds to the common methodology, i.e., market value. Therefore, a comparison of national vs. common methodology would be of low interest.

Figure 9: Asset allocation of DB/HY plans, baseline scenario



Source: European countries: EIOPA 2019b; Switzerland: OAK BV, 2018, p. 36.

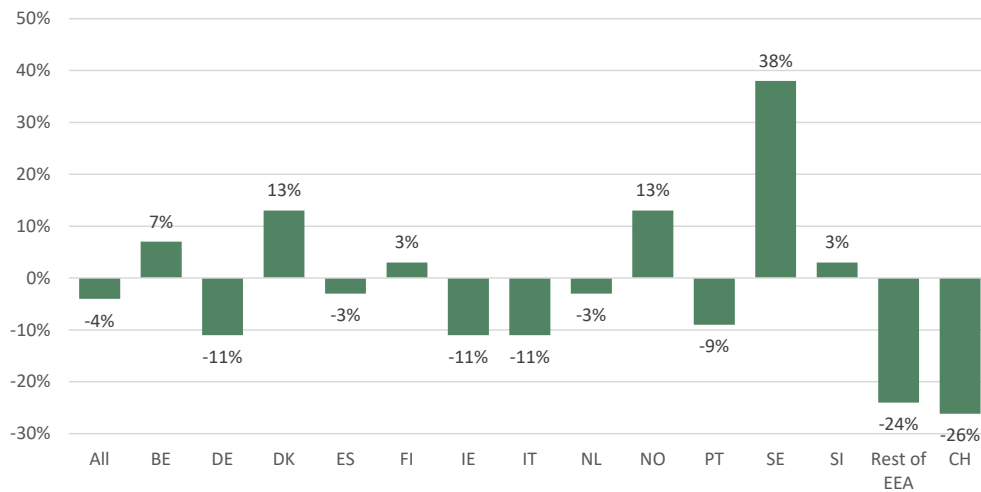
Note: “All” does not include Switzerland.

The average allocation to fixed income assets corresponds to 50% in the EIOPA stress test sample and to 41% in Switzerland. Compared to the European countries, the fixed income share is substantially lower in Switzerland. At first glance, it appears that the investment risk of Swiss IORPs is higher than the European average. However, the full insurance scheme, which would substantially reduce the investment risk for the pension fund, is not considered in the asset allocation of Switzerland. There is also a high exposure to equities with 26% and 30%, respectively. Property investments account for 20% in Switzerland which is double the average EIOPA allocation. The remaining 9% in Switzerland consist of primarily hedge funds (21%), private equity (24%) and infrastructure investments (13%).

4.2.3.2 Excess of assets over liabilities

In the common balance sheet, the excess of assets over liabilities is zero by construction, since a potential deficit must always be balanced by sponsor support, pension protection scheme or benefit reductions. However, the excess of assets over liabilities excluding sponsor support, pension protection scheme or benefit reductions discloses the funding deficit before it is absorbed by those items. The following figure shows the corresponding results. In the baseline scenario under the common methodology, the EIOPA sample has an excess of assets over liabilities of -4%, which is driven by the Netherlands. On average, the Swiss funding deficit is substantially higher with -26%.

Figure 10: Excess of assets over liabilities in common methodology excluding sponsor support, pension protection scheme and benefit reductions, in % of liabilities



Source: European countries: EIOPA 2019b; Switzerland: own calculations.

Note: "All" does not include Switzerland.

4.3 Adverse scenario: national vs. common methodology

In this section, the impact of the adverse market on the IORPs is presented. While the national balance sheet shows how the adverse market scenario would reduce the funding ratio from a national accounting view, the common methodology allows for international comparability.

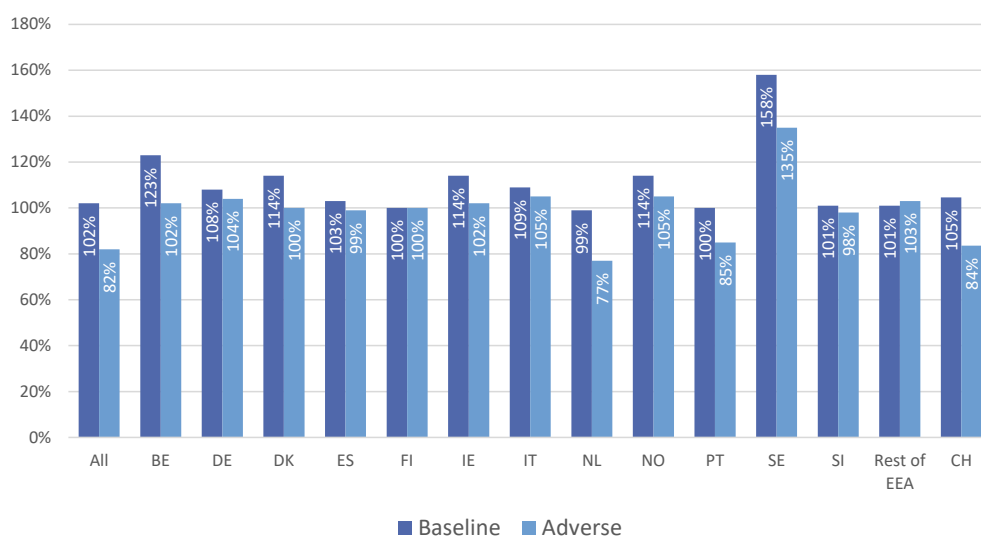
Content

4.3.1 National Methodology

The following figure shows the funding ratios for the baseline and adverse scenario based on the national methodology.

International comparison

Figure 11: Funding ratio in baseline and adverse scenario, national methodology



Source: European countries: EIOPA 2019b; Switzerland: own calculations.

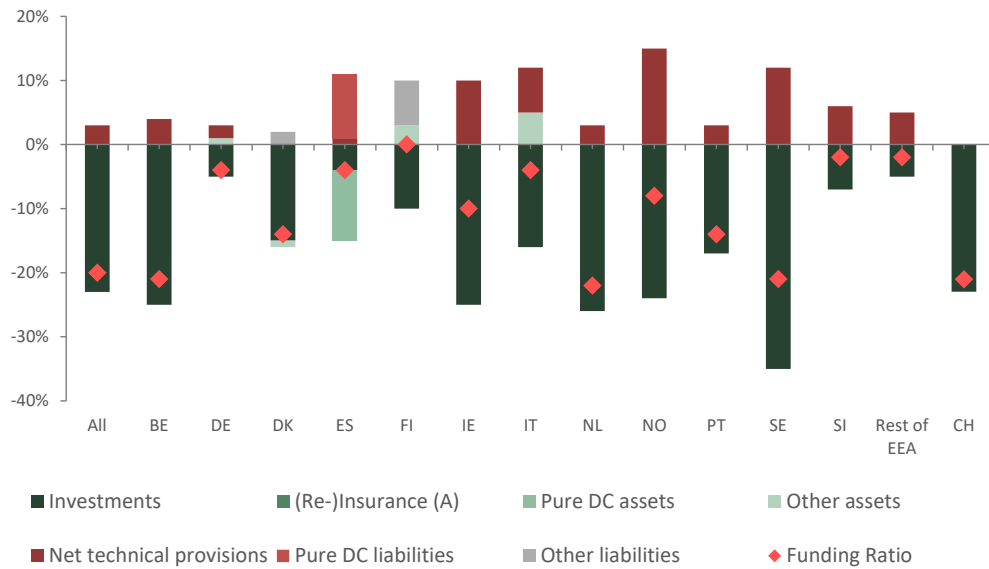
Note: "All" does not include Switzerland.

On average, the effects of the adverse scenario on the European countries and Switzerland are similar. In the European countries, the aggregate funding ratio decreases from 102% to 82% of liabilities. The excess of assets over liabilities in absolute terms falls from EUR 21bn to EUR -179bn.²⁸ In Switzerland, the funding ratio would be reduced by -20.4%, the excess of assets over liabilities would fall from EUR 34bn to EUR -117bn.

The following figure shows a decomposition of the effects on the funding ratio.

²⁸ EIOPA, 2019b, p. 24.

Figure 12: Decomposition of the impact of the adverse market scenario on funding ratio, national methodology



Source: European countries: EIOPA 2019b; Switzerland: own calculations.

Note: "All" does not include Switzerland.

All countries have in common the negative impact of the adverse scenario on the investments. However, there are large differences in the size of the impact.

To what concerns the liability side, there is more variety among the countries. In those countries that use risk-free rates as a basis to determine the discount rate (e.g., DK and NL), the increase in the risk-free rate instantaneously results in a decrease in the liabilities on the national balance sheet.²⁹

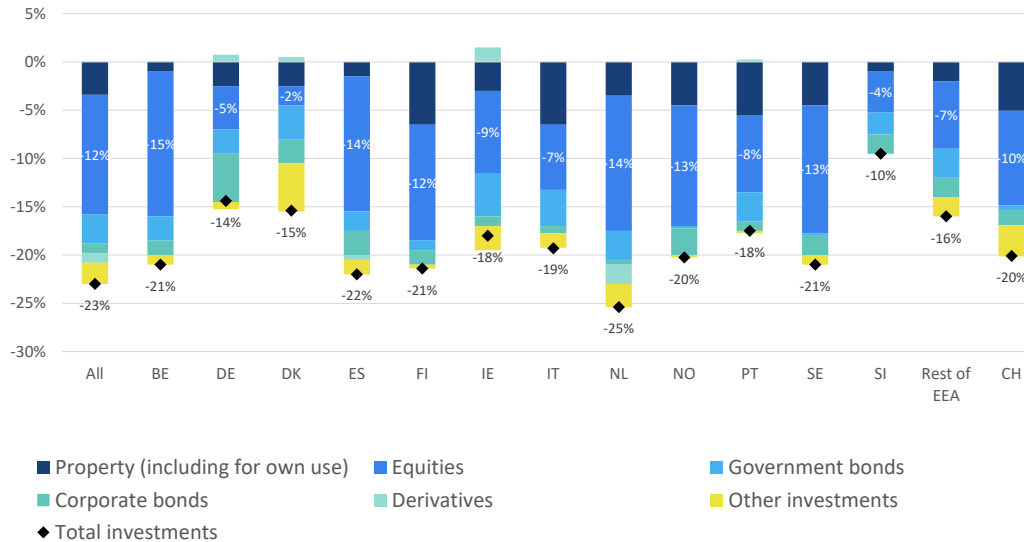
In Switzerland, the technical interest does not increase automatically. However, the shift of the interest rate level would, in the medium term, lead to an increase in the technical interest rate as well. In our representative pension fund, we assume that the shift between the technical interest rate is equal to the market interest rate.

²⁹ EIOPA, 2019b, p. 26.

4.3.2 Common Methodology

In the following figure, the impact of the adverse scenario on the investment side is shown, decomposed by investment category. Investments

Figure 13: Impact of the adverse market scenario on investments



Source: European countries: EIOPA 2019b; Switzerland: own calculations.

Note: "All" does not include Switzerland.

At the European level the adverse market scenario leads to a decrease of investments assets of 23% (approximately EUR 249bn). The main factors of this decrease are the impacts on equities (-12%), property and government bonds (each -3%).³⁰

The adverse market scenario leads to a decrease of investment assets of 20% in Switzerland (approximately CHF 178bn). The main factors of this decrease are equities (-10%), property (-5%) and other investments (-3%).

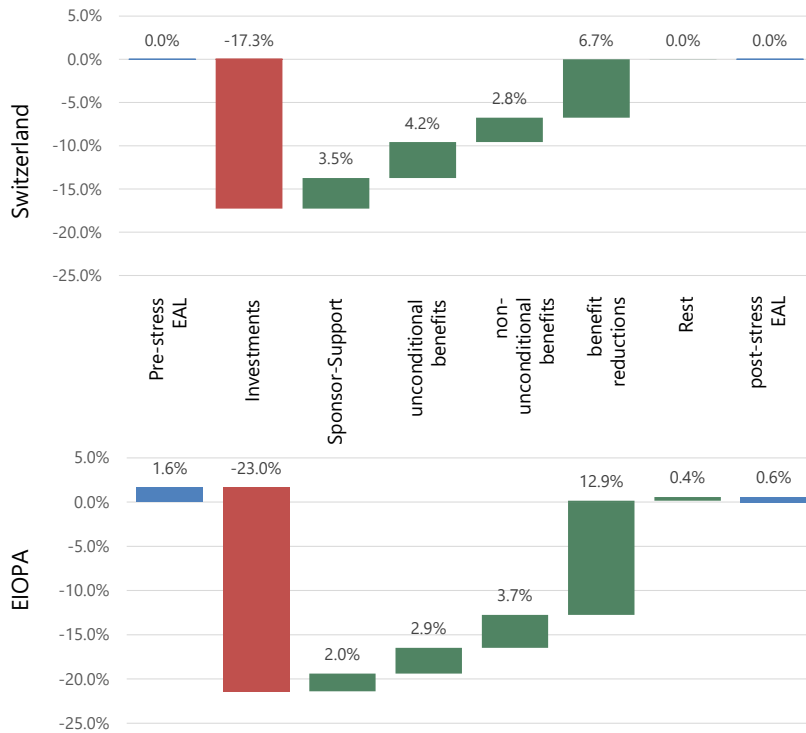
The decrease of investment assets is potentially absorbed through the following channels: Absorbing effects

- increase in **sponsor support**;
- reduction of technical provisions for **unconditional benefits** through increase of risk-free rates;
- decrease of **non-conditional benefits**;
- other **benefit reductions** not fulfilling the criteria of the other components.

The absorbing effects apparently highly depend on the pension scheme and the regulatory framework. At an aggregate level, detailed conclusions about the underlying mechanics are not possible. Only for Switzerland, which is reported individually, the cause-effect relationships can be explained in detail. The following figure shows the

decomposition of the changes in the excess of assets over liabilities, all items in percent of the baseline liabilities.

Figure 14: Impact of the adverse market scenario on items in common balance sheet, in % baseline liabilities



Source: European countries: EIOPA 2019b; Switzerland: own calculations.

Switzerland

The reduction of the investments in Switzerland, amounting to -17% totally, was already shown and explained above. Because of the immediate drop in plan assets, the sponsor support increases by 3.5%. The value of the unconditional benefits (which in Switzerland refers to all guaranteed benefits) decreases and this leads to a 4.2% increase of the EAL. The reduction of non-unconditional benefits (which in Switzerland refers to adjustment of interest rates on savings accounts and changes of the regulatory conversion rate) leads to an increase of the EAL by 2.8%. Finally, the remaining gap of 6.7% is absorbed by unspecified benefit reductions for plan members.

³⁰ EIOPA, 2019b, p. 27.

The most important differences between EIOPA-results and Switzerland are the following: EIOPA

- The effect on the investments (-23%) is stronger than in Switzerland. One reason for this result is that for Swiss IORPs full insurance schemes stabilize the EAL.
- The sponsor contributions (2.0%) is slightly lower than in Switzerland.
- The benefit reduction (12.9%) is substantially higher than in Switzerland.

5 Conclusion

Since 2015, EIOPA has conducted stress tests for pension funds every two years as part of its supervisory activities. In the 2019 stress test, 176 pension schemes from the European Economic Area participated. The aim of the stress test is to check the resilience of pension systems to financial market shocks and to measure the implied systemic risks. In this study, c-alm AG applied the stress test to Switzerland and compared the results with those from the EIOPA stress test.

The financial market shock would reduce the pension assets of the average Swiss pension plan by approximately 20%. This takes into account that the full insurance solutions would not experience an asset collapse.

In the common methodology, the decrease in assets amounts to 17.3% of the liabilities. The lower value results from the higher level of obligations in the common methodology. The common methodology requires that a shortfall resulting from the financial market shock is fully absorbed by benefit reductions of the active plan participants, by the sponsor or by a (possible) rescue fund. To determine these effects, we have assumed a mechanism typical for Swiss pension funds, which provides for recovery contributions by employees and employers and reduced interest rates on the retirement assets of active plan participants, depending on the funding ratio.

The employer recovery contributions close 3.5%-points of the deficit; the higher yield curve resulting from the financial market shock leads to lower pension liabilities (valuation effect), which reduce the deficit by 4.2%-points. The assumed benefit mechanism (interest on retirement assets depending on the funding ratio) leads to a reduction of the deficit by 2.8%-points; finally, it is assumed that employee restructuring contributions and benefit cuts close the deficit completely and thus by the remaining 6.7%-points. This is where the biggest difference to the European countries (aggregated) becomes apparent: in the pension schemes examined in the EIOPA study, more than 50% of the funding gap is absorbed via benefit cuts. However, this result is largely attributable to the Dutch pension system.

With a share of over 140% of GDP, the second pillar in Switzerland must clearly be considered systemically relevant. Both an international and a national comparison of the resilience of Swiss pension funds analogous to the EIOPA stress test would be welcome in principle. The dependencies on the financial market represent risks that require corresponding risk carriers and could be assessed by means of a stress test. The application of a uniform valuation method, taking into account the possible recovery measures in the event of a shortfall, could represent a step towards better comparability of the financial situation of pension funds, also within Switzerland.

As always, however, the crux of the matter lies in the implementation: in order to actually ensure comparability, the pension funds would all have to carry out the risk-neutral valuation in an identical manner. Carrying out a risk-neutral valuation would mean a great deal of additional work for the pension funds. The results are also highly sensitive to the assumptions made, especially with regard to possible measures, benefit adjustments and employer support in the event of a severe underfunding. In an extreme scenario such as that of the stress test, additional legal changes would have to be expected in the long term, which would strongly influence the result. In short, the assumptions regarding very uncertain parameters dominate the results and thus strongly relativize the comparability.

This uncertainty in the assumptions raises the question of who will have to bear the risks in the long term. In particular, it is questionable whether policymakers would react in the event of a financial market shock and adjust the benefit parameters (especially the conversion rate and the minimum interest rate) so that the active plan participants would bear the risks, or whether additional funding would be required from the employer. Finally, it is questionable whether, based on the assumption-driven results, regulatory measures should actually be ordered for individual pension plans in order to reduce the risks.

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