



# Inflation in Non-Life Insurance

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# Agenda

01

Introduction

02

Terms and Definitions

03

Survey Results

04

Insights from the  
Working Group

05

Summary

06

Q&A







01

# Introduction



## How big is the problem?



We see the inflation challenge as far from over, even if a drop in headline inflation below core in many economies soon creates an illusion of having conquered it.  
- Swiss Re Institute<sup>1</sup>

Inflation is down but not out, with services inflation remaining troubling amid strong demand.  
- Zurich Insurance<sup>2</sup>

Inflation remains a persistent issue for 2023 and 2024.  
- Munich Re<sup>3</sup>

Perceived inflation in the euro zone is almost three times as high.  
- Allianz Trade<sup>4</sup>

Inflation in the euro area is too high and is set to remain so for too long  
- Christine Lagarde<sup>5</sup>



<sup>1</sup> <https://www.swissre.com/institute/research/sigma-research/Economic-Outlook/economic-financial-risk-insights-june-2023.html>

<sup>2</sup> <https://www.zurich.com/en/economics-and-markets/publications/inflation-focus>

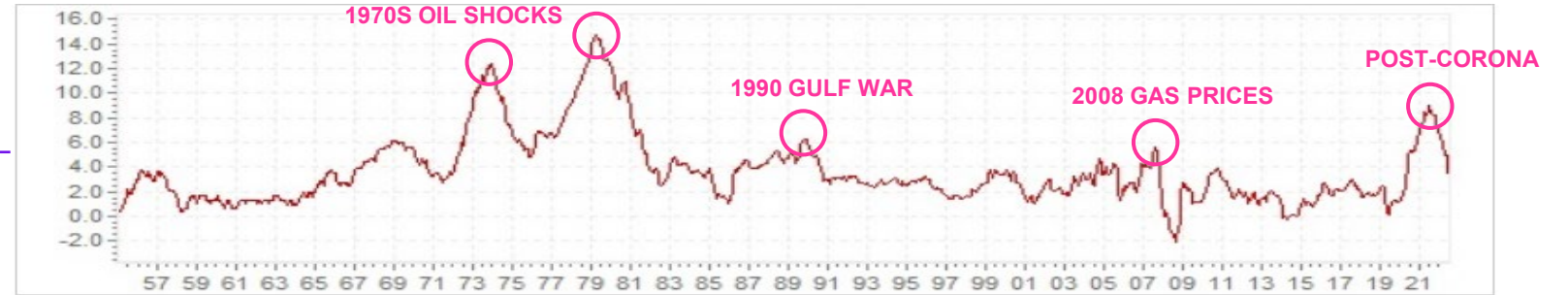
<sup>3</sup> <https://www.gdv.de/gdv/themen/wirtschaft/chefvolkswirte-von-versicherern-rechnen-mit-weiteren-zinsschritten-136880>

<sup>4</sup> [https://www.allianz-trade.com/de\\_CH/news/medien/allianztrade-inflation-automobil-2023.html](https://www.allianz-trade.com/de_CH/news/medien/allianztrade-inflation-automobil-2023.html)

<sup>5</sup> <https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp230627~b8694e47c8.en.html>

# Historical Inflation Rates

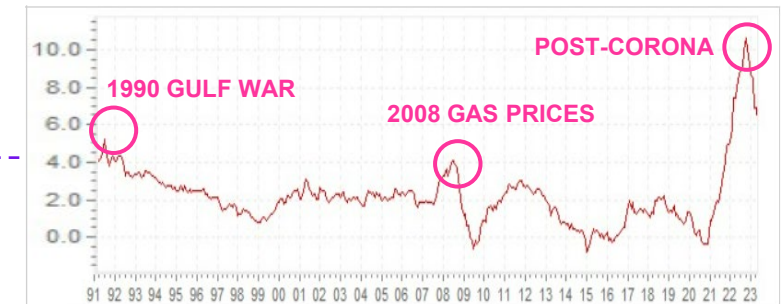
**United States**  
(CPI YoY Change)<sup>1</sup>



**Switzerland**  
(CPI YoY Change)<sup>2</sup>



**Europe**  
(HCPI YoY Change)<sup>3</sup>



<sup>1</sup> <https://www.inflation.eu/de/inflationsraten/vereinigte-staaten/historische-inflation/vpi-inflation-vereinigte-staaten.aspx>

<sup>2</sup> <https://www.inflation.eu/de/inflationsraten/schweiz/historische-inflation/vpi-inflation-schweiz.aspx>

<sup>3</sup> <https://www.inflation.eu/de/inflationsraten/europa/historische-inflation/hvpi-inflation-europa.aspx>

# Inflation is not all equal

## Inflation rates by country in Europe<sup>1</sup>



in % 2 4 6 8 10 12 14 18 20 22



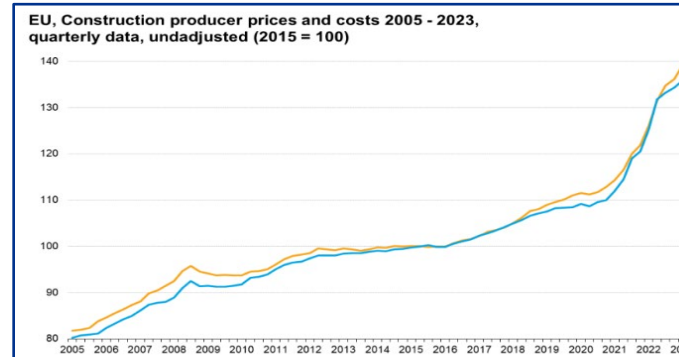
<sup>1</sup> Eurostat: <https://www.touteurope.eu/economie-et-social/le-taux-d-inflation-en-europe/>

<sup>2</sup> [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Construction\\_producer\\_price\\_and\\_construction\\_cost\\_indices\\_overview](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Construction_producer_price_and_construction_cost_indices_overview)

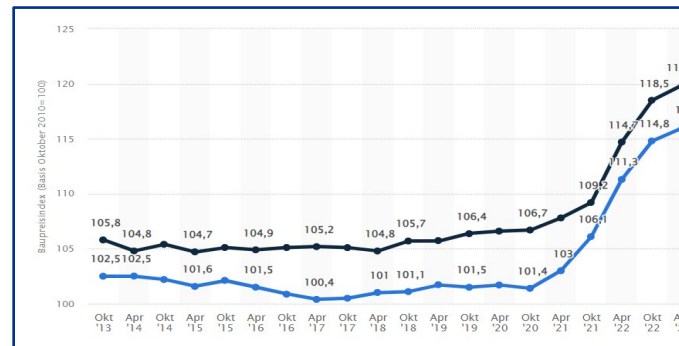
## Construction Prices and Costs



### Europe<sup>2</sup>



### Switzerland<sup>3</sup>

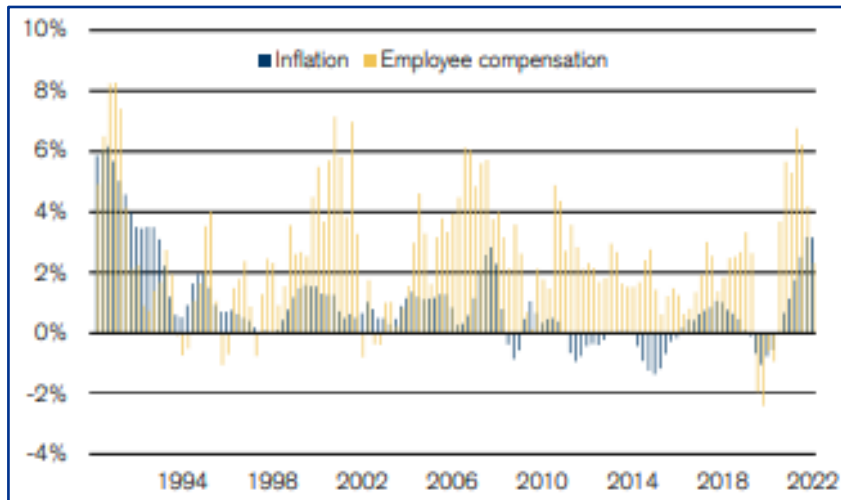


<sup>3</sup> <https://de.statista.com/statistik/daten/studie/382575/umfrage/baupreisindex-fuer-hoch-und-tiefbau-in-der-schweiz/>



# Wage-Price spiral in Switzerland

## Employee compensation declining in price-adjusted terms



Source: State Secretariat for Economic Affairs (SECO), Federal Statistical Office (FSO), Credit Suisse. Last data point: Q4 2022

\*Monitor Schweiz 2023 (Credit Suisse)

## Wage growth expectations in Switzerland



TRADINGECONOMICS.COM | SWISS FEDERAL STATISTICAL OFFICE

\*Trendingeconomics.com



02

# **Terms and Definitions**



# Claims inflation vs. general inflation

## General inflation



1. A general increase in prices and fall in the purchasing value of money. This is often called 'monetary inflation'.
2. Inflation in the economic sense is understood to mean an increase in overall prices or, to put it another way, in the general price level.

## Claims inflation



1. A general increase of claim costs over calendar periods.
2. Claims inflation is the change in expected or realized claims expense for an identical insurance portfolio over a period of time.

Source:

- Reserving and Inflation, René Dahms
- Ergebnisbericht DAV: Berücksichtigung der Inflation in der Tarifgestaltung und Reservierung in der Schaden-/Unfallversicherung

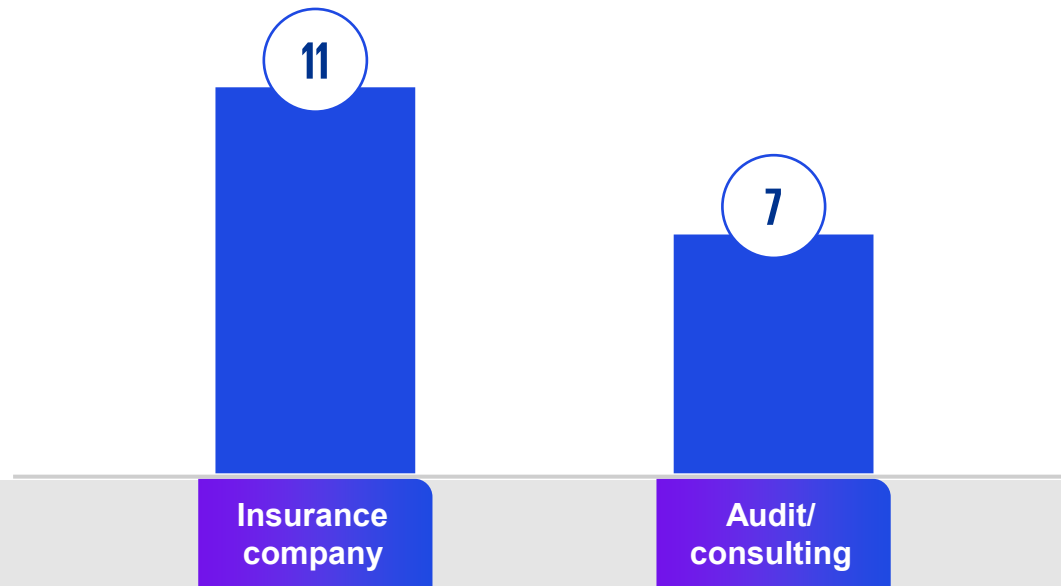


03

# Survey Results

# Industry categorization

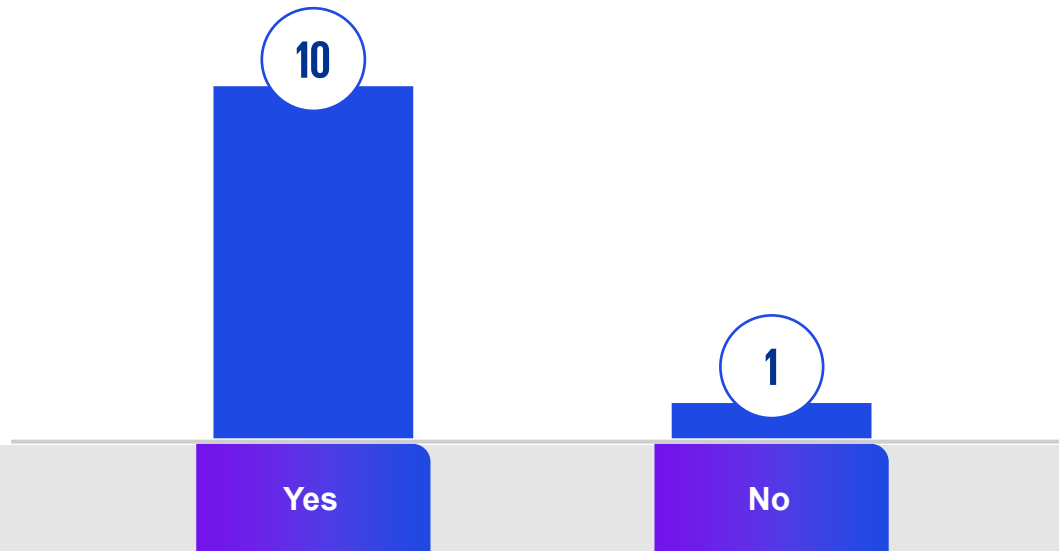
I am working for an





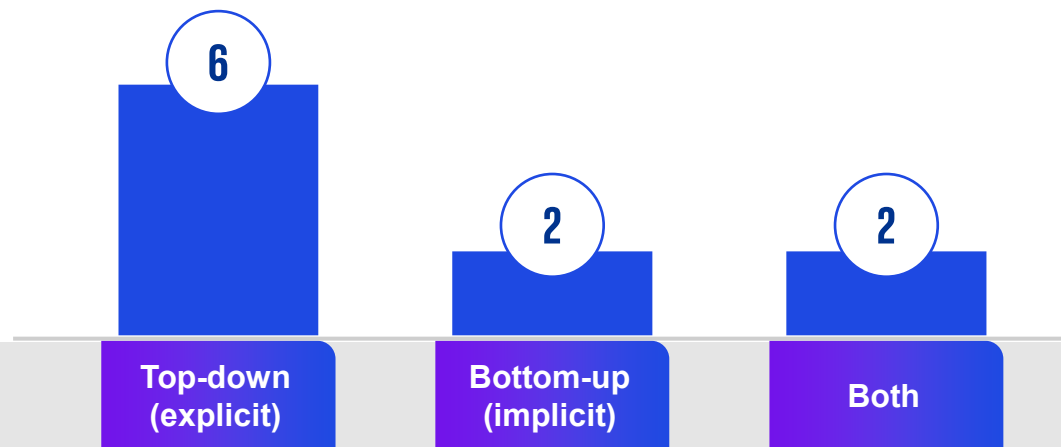
# Insurance Questionnaire

Do you make an allowance for inflation in your company's reserve estimates at year-end 2022?



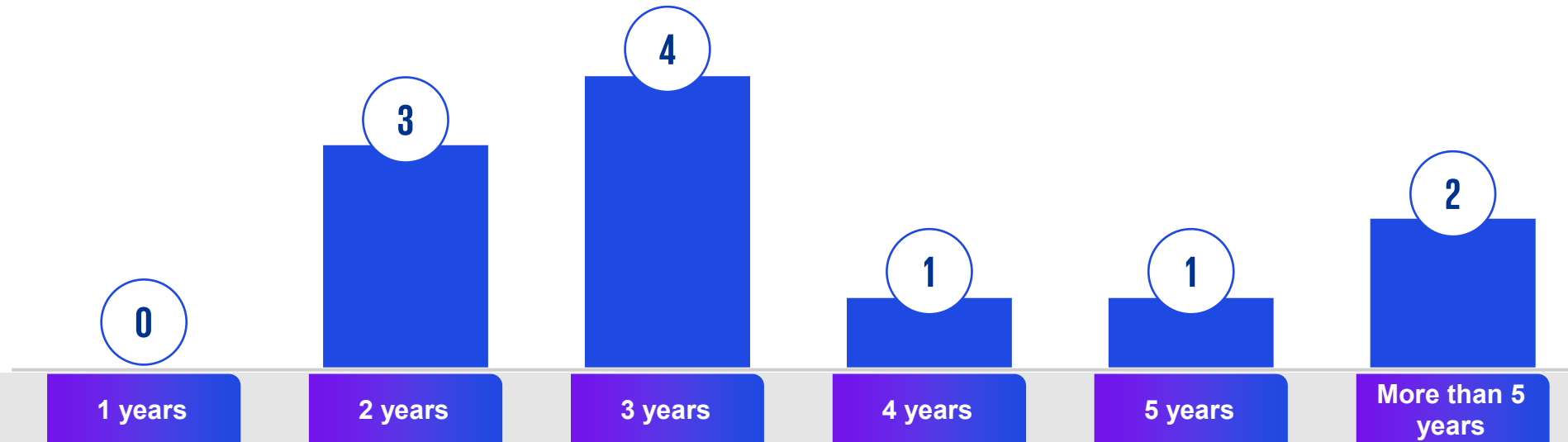
# Insurance Questionnaire

If the answer to question 1) is yes, are you doing a top-down (explicit) adjustment, i.e., inflation load or a bottom-up (implicit) adjustment, i.e., by adjusting underlying reserving assumptions as of year-end 2022?



# Insurance Questionnaire

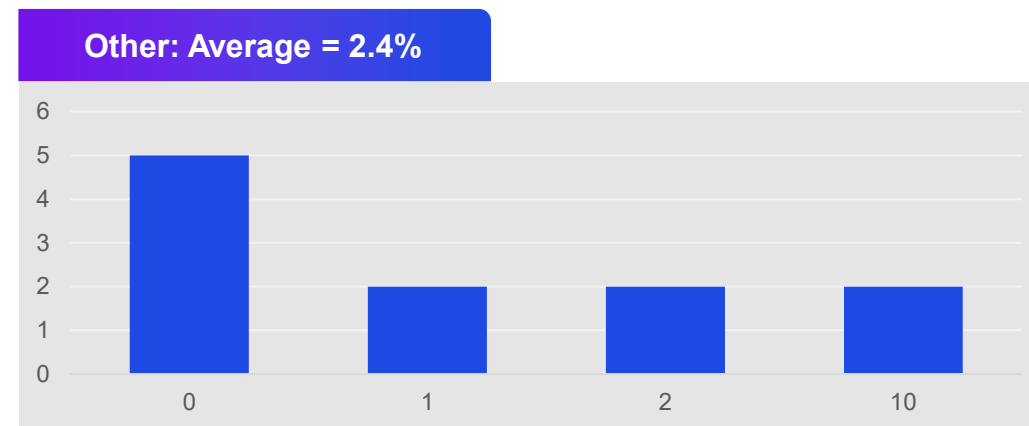
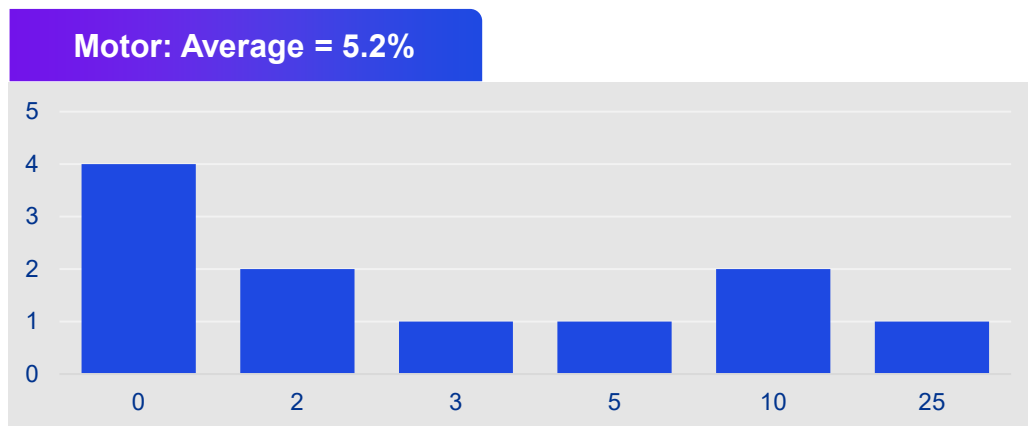
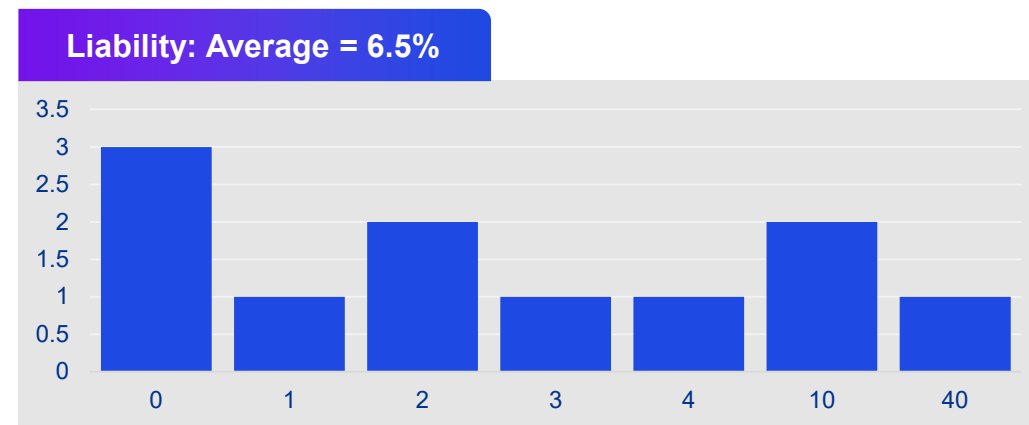
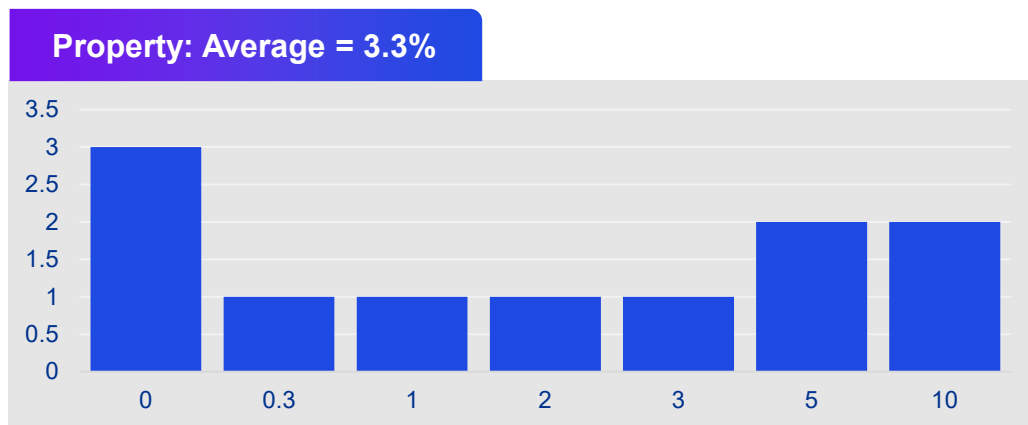
What is your company's estimate of the number of years for which there will be excess inflation (including 2022)?





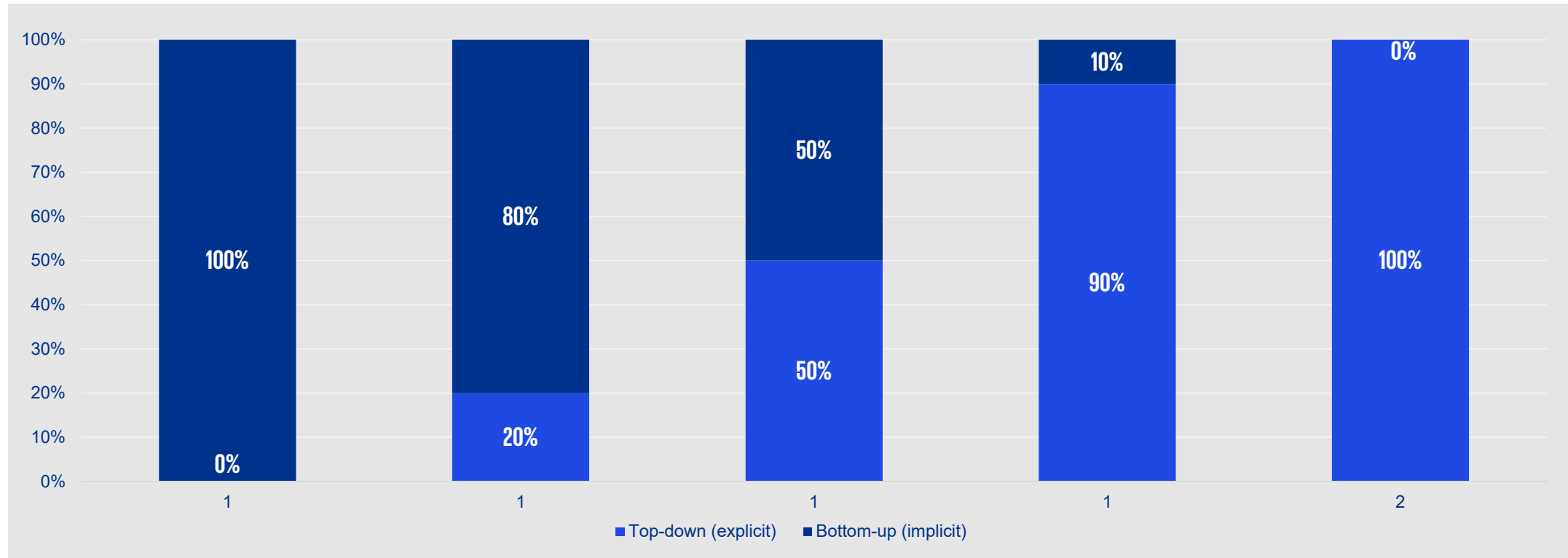
# Insurance Questionnaire

What percentage load do you add to the non-life reserves as of year-end 2022?



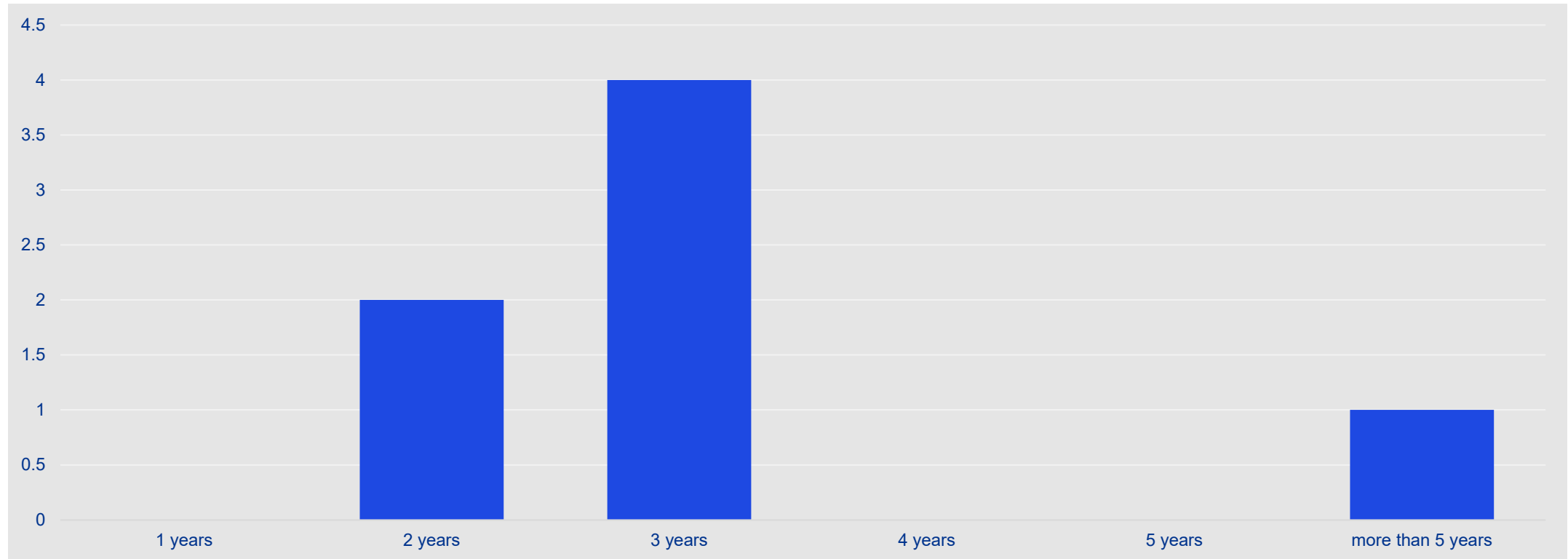
# Audit / Consulting Questionnaire

Of those that are making an allowance, what percentage would you say is doing a top-down (explicit) adjustment, versus a bottom-up (implicit) adjustment?



# Audit / Consulting Questionnaire

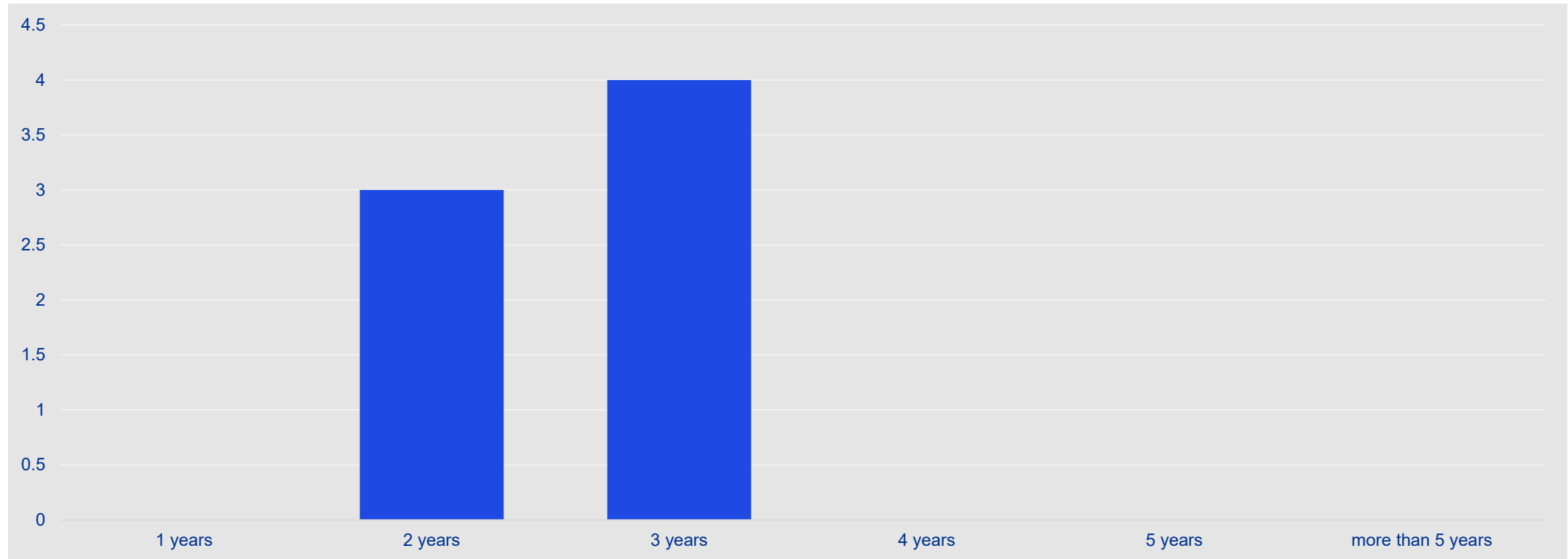
What is your estimate of the number of years for which there will be excess inflation (including 2022)?





# Audit / Consulting Questionnaire

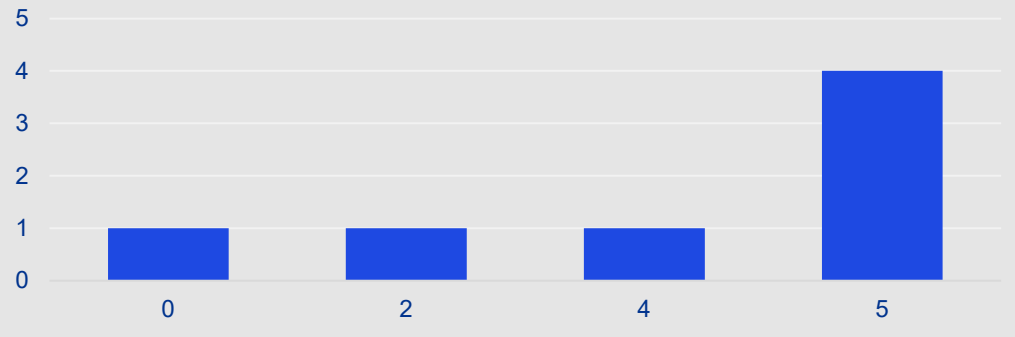
What are the majority of your clients assuming for the number of years for which there will be excess inflation (including 2022)?



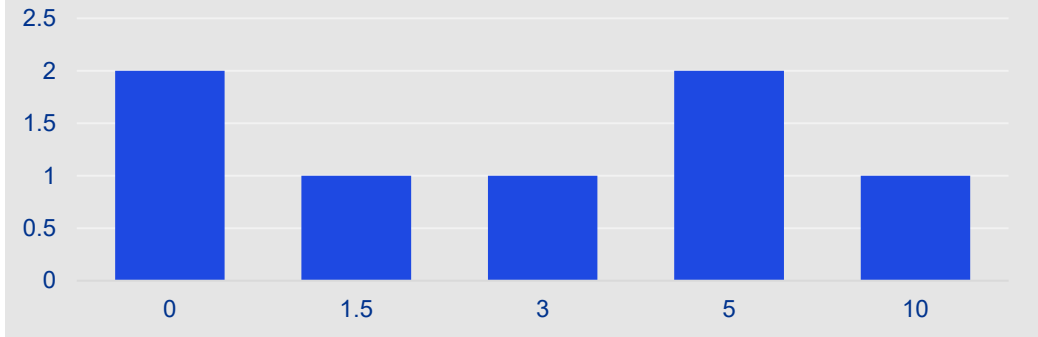
# Audit / Consulting Questionnaire

What percentage load are you seeing on average added to the non-life reserves?

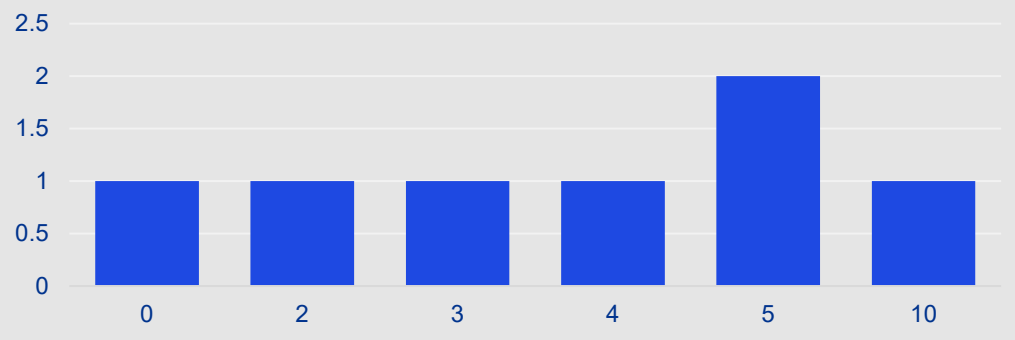
Property: Average = 3.7%



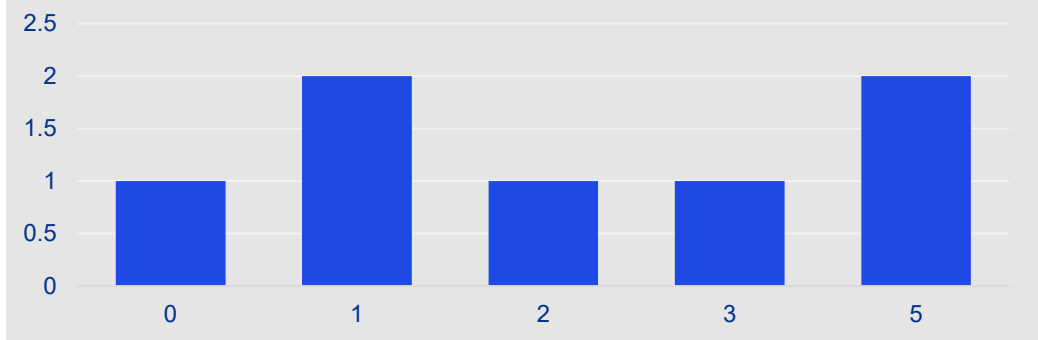
Liability: Average = 3.5%



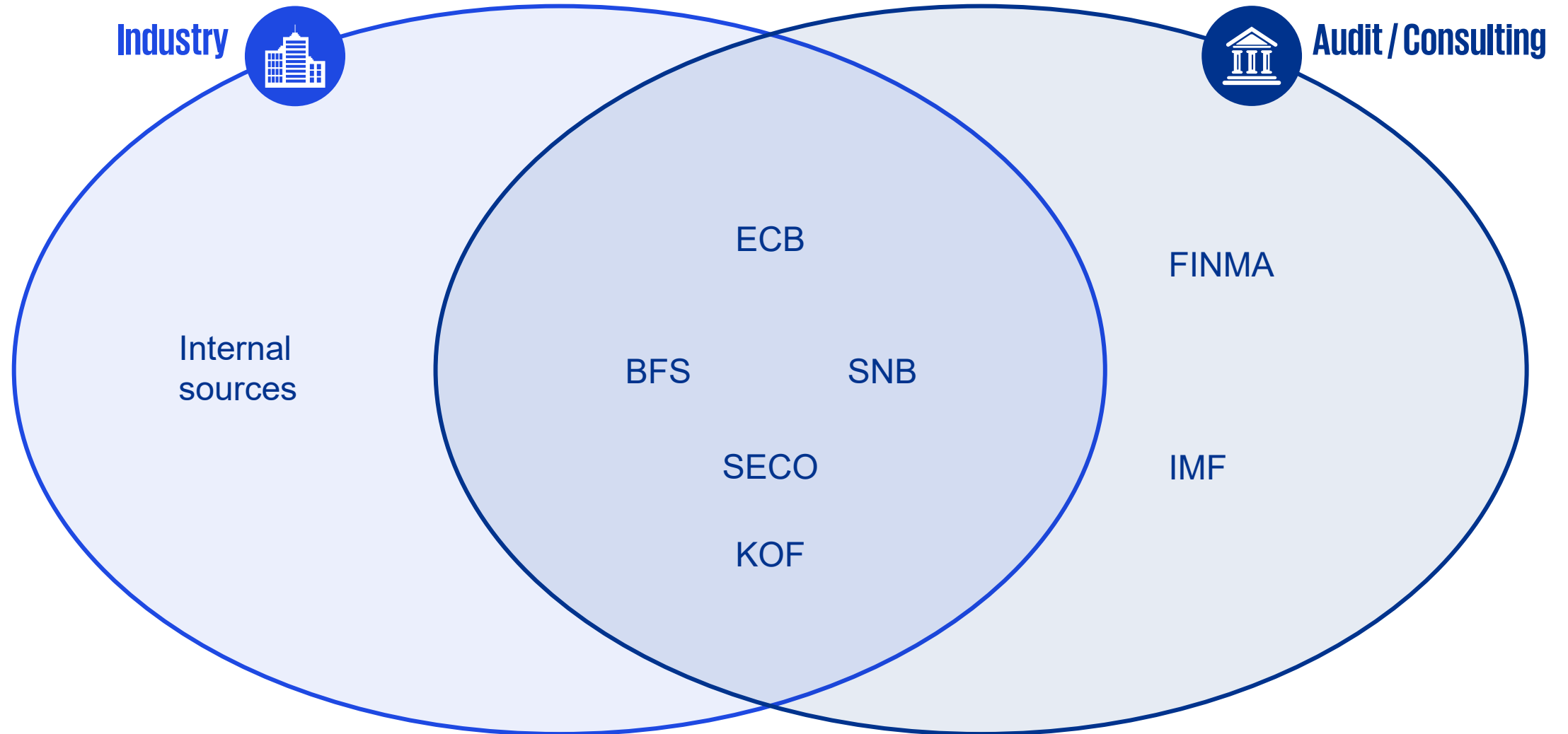
Motor: Average = 4.1%



Other: Average = 2.4%



# External Sources





04

# Insights from the Working Group



## Points to consider:

- Line of Business and Sub Line of Business
- Identify the sources of change among others past inflation such as e.g. Covid-19, Court Decisions etc.
- Understand adjustments from underwriting, claims management
- Usage of a public and relevant inflation index and forecast of the inflation index, if available

## Possible Methods:

- **Deflate → Estimate → Inflate**
  - mean amounts of excess claims for fixed excess points have stable pattern
  - Remark: In practice Verbeek's approach is often very unstable
- **Chain Ladder Method<sup>1</sup>:**
  - Inflation-adjusted development factors: separate basic stationary claim delay distribution from the exogeneous influences
  - Remark: In practice Taylor's approach is often very unstable
- **Average Cost per Claim (ACPC)<sup>3</sup>:**
  - Inflation-adjusted average claim and inflated-adjusted claim count projections
  - Projected Payments per Claim Incurred (PPCI)
  - Projected Payments per Claim Settled (PPCS) / Payments Per Claim Finalized (PPCF)
- **Expected Number of Claims<sup>2</sup>:**
  - Inflation-adjusted number of claims: 5 Assumptions, of which number of claims is Poisson distributed and the

<sup>1</sup> Taylor, G.C. (1977) "Separation of inflation and other effects from the distribution of non-life insurance claim delays"

<sup>2</sup> H. G. VERBEEK (1972) "An approach to the analysis of claims experience in motor liability excess of loss reinsurance"

<sup>3</sup> Antony Cloughton (2013) "Australian reserving methods"

## Group 2

# How to run-off the inflation loadings (when actual experience contains inflated losses)

### Implicit estimation:

- Most models will implicitly run-off the additional inflation load
- AvE tracking as well as distortion in the underlying patterns will be central to assess the reasonability of the assumptions

### Explicit estimation:

- Explicit Load (e.g. percentage of the estimated ultimate amounts): the run-off should be in line with the expected cashflows. Tracking through AvE and diagnostics (ACPC and other metrics) to ensure that the load is properly released.
- Cash-Flow methods: (e.g. reserve load for excess inflation calculated based on the timing of the payments and the estimated excess inflation):
  - Complexity increases for longer-tailed lines of business: How many years? How to estimate the excess inflation?
  - Importance of the tracking of economical assumption and of the emerging experience.
  - Recurrent update of the estimate and of the assumptions is important (decompounding of the inflation assumptions and reassessment of the loads)
  - Ranges can be useful to avoid noise in the estimates.

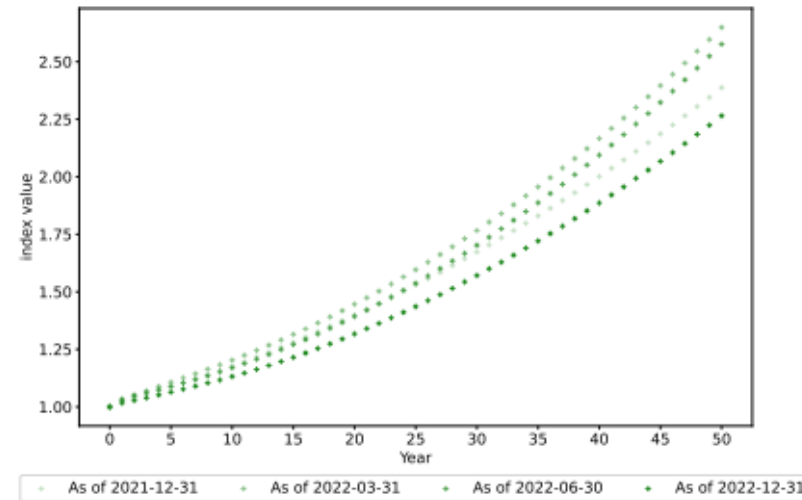
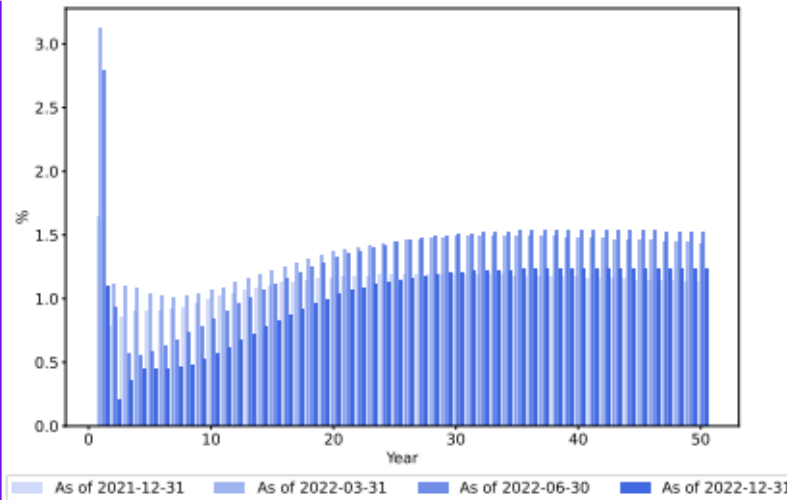
## Group 3

# How to predict / estimate future claims inflation

Yves Duvanel and Oliver Strub have written a note on deriving market-consistent inflation expectations for insurance reserving in Switzerland:

- The idea is to use information from other inflation-protected securities such as US TIPS together with the purchasing power parity (PPP) and the uncovered interest rate parity (UIP)
- The method is applied to determine market-consistent CPI inflation expectations for Switzerland
- Based on these CPI inflation expectations, derivation of expectations for the wage inflation using a regression model

Market-consistent CPI inflation expectations (1 year forward rates) for Switzerland<sup>1</sup>



Expectations for the wage index<sup>1</sup>

<sup>1</sup> Report authored by Yves Duvanel and Oliver Strub from Schweizerische Mobiliar Versicherungsgesellschaft AG, published on 10 August 2023; Working Title: "Deriving market-consistent inflation expectations for insurance reserving in Switzerland"

## Group 4

# Lessons learned from high-inflation environments

### In a high-inflation environment...

- ... sum insured lost its meaning as values adjust very quickly.
- ... premium are adjusted (increased) frequently, e.g., monthly.
- ... insurance becomes unattractive as salary adjustments are less frequent.
- ... therefore, only mandatory insurance is being sold.
- ... policy conditions remain stable.
- ... mid- to long-term prediction of inflation is the hardest part.
- ... UW result is expected to be adverse.
- ... the offsetting thereof is reflected in the investment results.
- ... timing of cash flows (premiums and claims) becomes relevant.

### In a very-high-inflation environment...

- ... the concept of insurance itself is challenged as it becomes very difficult to appropriately quantify the value of the insured goods and also the claim amount as these are changing daily.



## Group 5

# Points to consider as a reserving actuary in an excess inflation environment

### Inflation “Modelling”

- find appropriate inflation index
- index needs to fit types of claims by line of business (see next slide)
- need to predict future inflation and select appropriate reserving methods
- Reserving methods: two approaches that should be considered
  - Average Cost per Claim (ACPC): with assumptions of past inflation to index to current values, and then assumptions for future inflation.
  - Development Factor Methods (DFM): add to the projected CFs the difference between assumed implicit inflation already in and the future inflation.
- Sensitivity analysis








### Work on Triangles

- monitor inflation development and adjust chain ladder accordingly
- if possible, consider relevant terms and conditions of the business (e.g. policy limits and deductibles, fixed indemnity amount)
- consider different impact of inflation on case reserves vs. IBNR reserves
- inflation might not only affect claims but also costs (e.g. claim settlement costs and hence ULAE reserves)
- consider dependency between inflation/economic environment/customer behavior, e.g. credit surety business might be affected due to more defaults

### Reinsurance specific considerations

- Use of stabilization clauses
- reserving actuary needs to understand what inflation assumptions went into the pricing
- inflation peak can be spread over several diagonals in the triangle in case of treaties on underwriting year (risk-attaching) basis

# Each Line of Business will be affected differently

LoB	PPI	CPI	Social Inflation	Wage Inflation	Medical Inflation	Construction Index
 Property	×	×		×		×
 Liability			×	×		
 Motor	×	×	×	×	×	
 Workers Comp.			×	×	×	
 Engineering	×	×		×		×
 Marine	×	×				
 Credit & Surety		×				



05

# Summary

# Summary

1. Over a longer time horizon the current inflation levels are not extraordinary.
2. It is generally difficult to predict inflation. Also experts fail.
3. A good toolbox to learn how to handle inflation is looking at high-inflation environments (e.g. Turkey of some countries in Latin America).
4. From a P&C reserving perspective, the best way to deal with inflation is:
  - i. deflate triangles
  - ii. project to ultimate
  - iii. inflate triangles
5. Inflation is “just another” diagonal effect.



06

**Q&A**





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