Reacfin

BENCHMARKING BELUX

NON-LIFE RESERVING IN TIME OF HIGH INFLATION

SEPTEMBER 2023

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We offer consulting services in actuarial science & quantitative finance, including a.o. capital, portfolio, product, risk and liquidity management. We build our expertise on broad data analytics capacities.

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We share our knowledge with our clients. We offer a comprehensive learning platform, including on-site trainings, e-learning modules, e-classrooms and webinars.

ABOUT **THE SPEAKER**

Xavier MARECHAL

CEO Reacfin and IA|BE qualified actuary

Expert in Non-Life and Health insurance (pricing, product development, reserving and risk management).

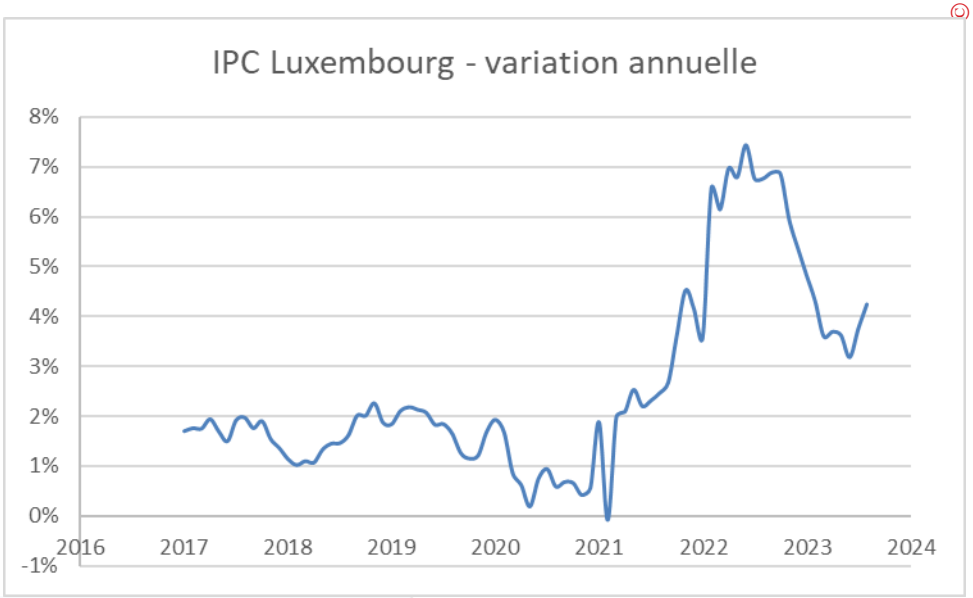
AGENDA

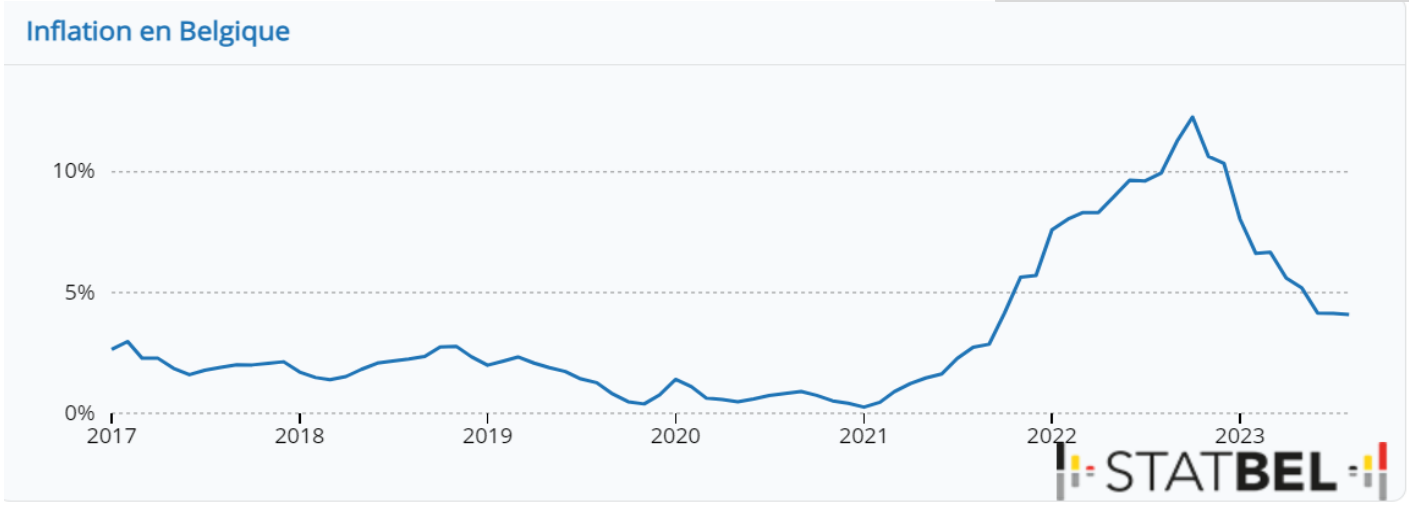
- **Introduction**
- Case reserves
- Global provisioning methods for best estimate
- Inflation indexes
- Local GAAP

INTRODUCTION

Macro-economic evolution and impact on insurance

- After a long period of relative stability, **inflation increased a lot** from mid-2021 in Luxembourg and Belgium
- This evolution had to be considered by non-life insurance companies when computing their **technical provisions** (i.e. when estimating future expected claims payments) but **how**?





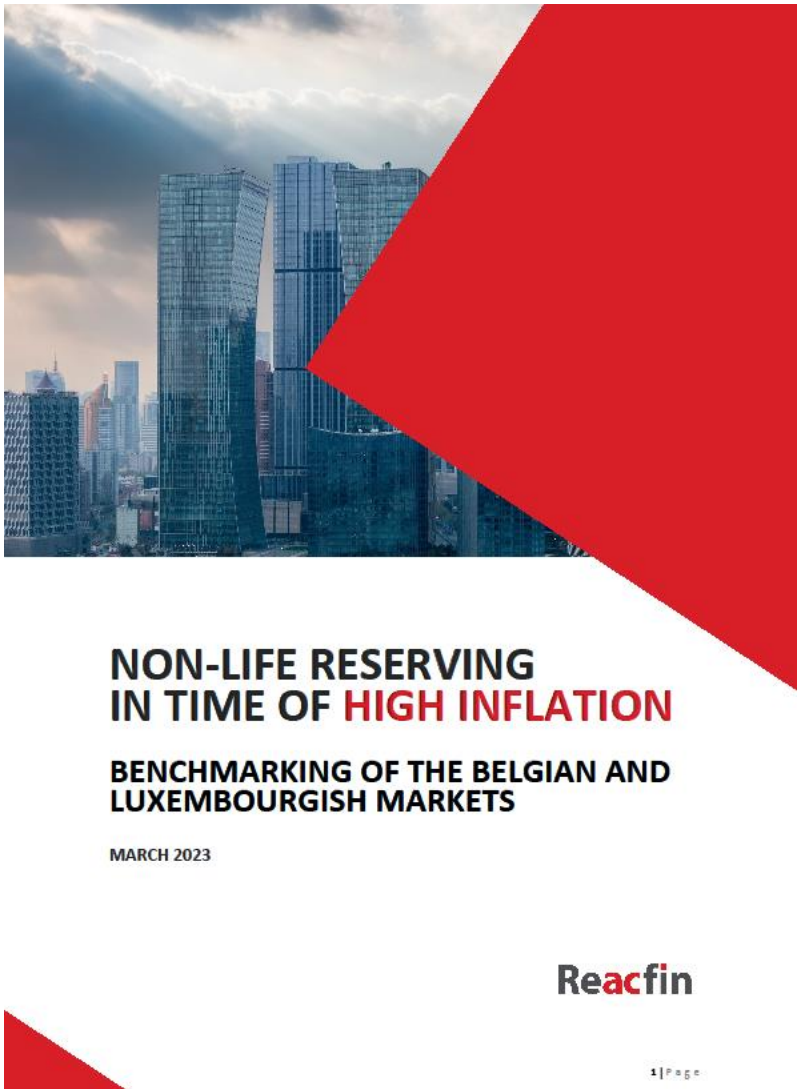
IPC moyenne annuel

Année	Inflation moyenne annuel
2017	2,13%
2018	2,05%
2019	1,44%
2020	0,74%
2021	2,44%
2022	9,58%

INTRODUCTION

Belux Benchmarking Q1/2023

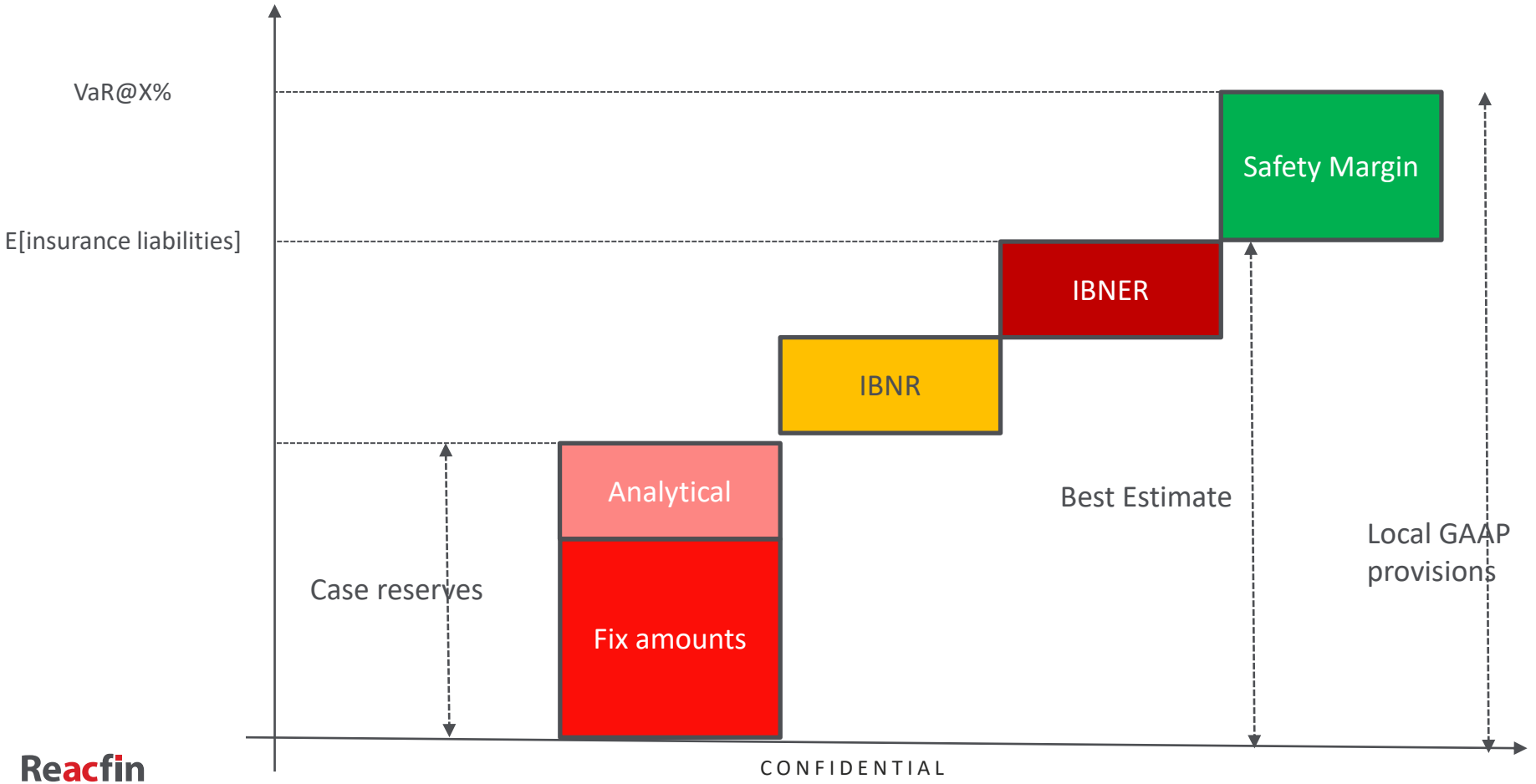
- The goal of this benchmarking was to analyze **reserving practices** of insurance companies in time of high inflation to identify market (best) practices.
- The scope of the benchmarking was non-life **claims provisions for non-annuity products** (gross of reinsurance)
- **Twenty-one companies** participated in the benchmarking
  - 19 of the top 20 companies in Belgium
  - the top 4 companies in Luxembourg
  - based on the premium income 2021 on their local market.
  - It represents more than **90% market share** in both countries.



CLAIMS PROVISIONS

Link between the different types of provisions

- The local GAAP claims provisions are usually higher than the Best Estimate (concept of prudence)
- The difference between local GAAP claims provisions and BE is called the (safety) margin



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- **Case reserves**
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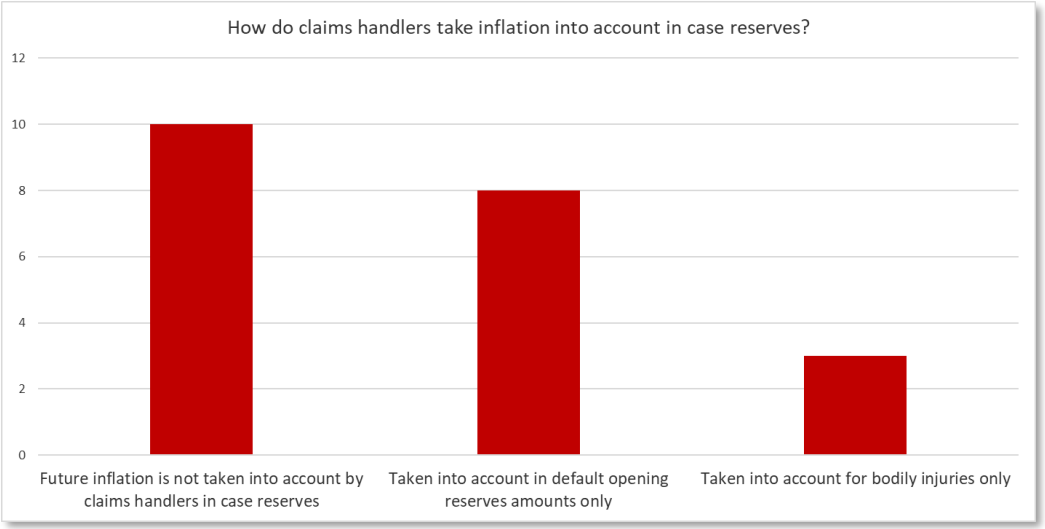
CASE RESERVE

Claims handlers vs future inflation

- For 10 respondents the claims handlers are **not supposed to consider additional future inflation** when determining the case reserves. The reasons are
  - No case reserves
  - For bodily injuries, they use the indicative table as a reference but do not consider any additional inflation
  - The default opening case reserves do not take into account future inflation

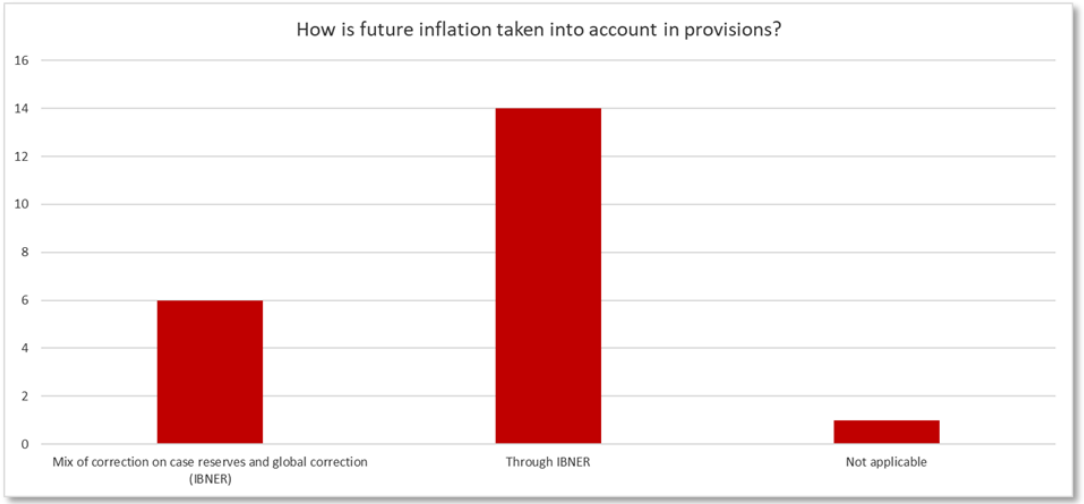
- The other half of participants mention that claims handlers **must take future inflation into account**
  - Only through the adaptation of the default opening case reserves to future inflation (8 participants) ➔ Actuarial teams adapting
  - Only through the adaptation of reserving practices for bodily injuries (3 participants) ➔anticipation of future evolution of the indicative table but no anticipation of future additional inflation



CASE RESERVE

Additional correction on case reserves

- Most of the companies (15) do not apply any correction on the case reserves.
  - Rather compute corrections at a global level (**IBNER**)
  - Without reallocation of this extra provision claim by claim in the case reserves
- For the 6 remaining companies, the additional correction applied is a mix between corrections on the case reserves and a global correction (IBNER)
  - Computation of a **correction factor** on the case reserves adapted by the claims handlers recently ➔ then applied to the files not yet adapted by the claims handlers.
  - Computation of the difference between the **target amount** of opening case reserves (containing estimation of specific future inflation by type of claim) and the current opening case reserves for open files ➔ **IBNER**
  - Calibration of the add-on by type of claim considering the types of claims affected by inflation or not and a specific inflation by type of claim ➔ **correction factor by LoB**



CASE RESERVE

REACFIN VIEW: calibration of default opening case reserves using explanatory variables

- Some companies use **default opening case reserves** (DOCR) to capture future inflation expectations.
  - It probably does not solve all the issues caused by expected future inflation (e.g. analytical provisions)
  - but updating regularly default opening case reserves looks like a good idea.

- We believe that there is room for **improvement on the market in terms of calibration** of default opening case reserves.
  - Segmentation of the DOCR in function of the characteristics of the claims.
  - Regression techniques (GLM or others) might be used to compute the average cost of claims in function of their characteristics (e.g. number of victims, gravity of the claim,…).

- Some companies have also developed regression models to compute not only the default opening case reserves but also to **update the case reserves over time** in function of the evolution of the characteristics of the claim
  - More relevant for standard claims as the calibration of models on large claims might be a bit more volatile.

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- Case reserves
- **Global provisioning methods for best estimate**
- Inflation indexes
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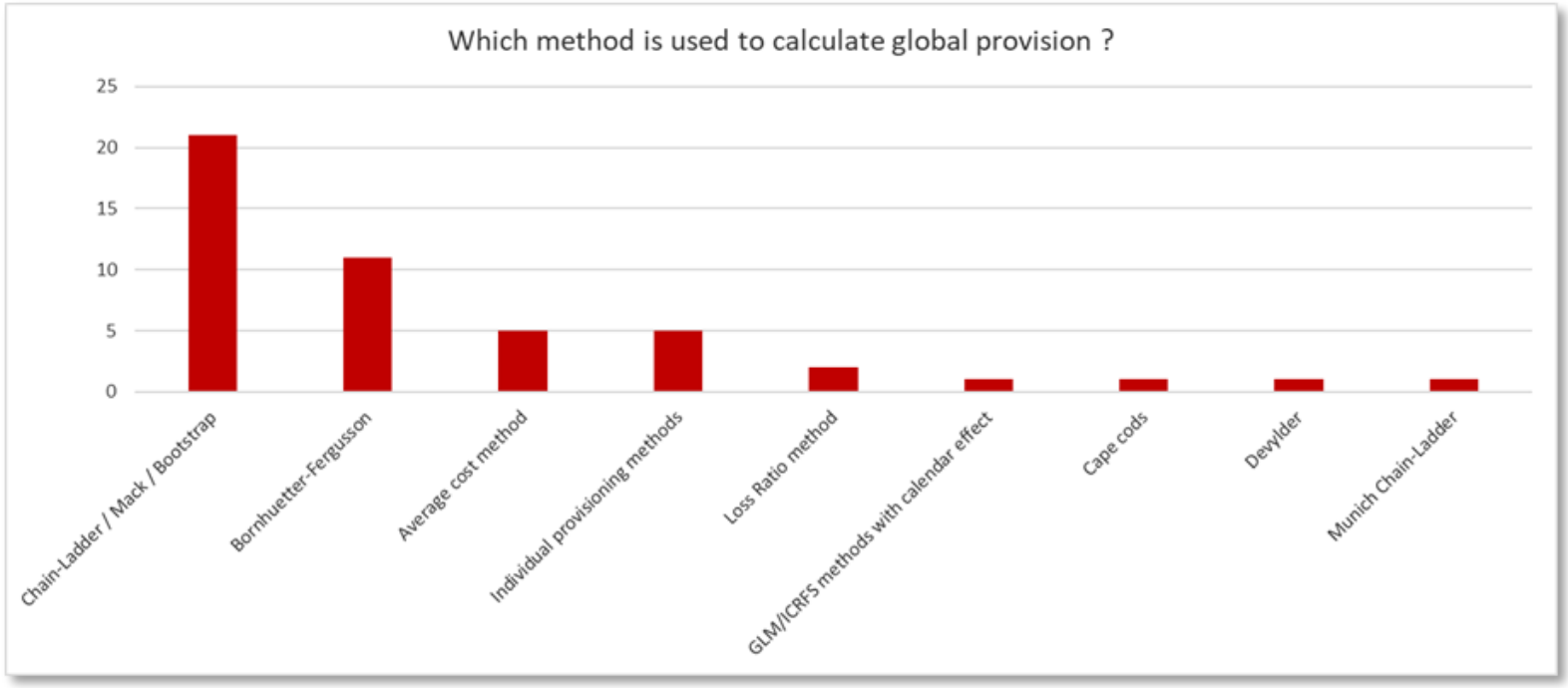
GLOBAL PROVISIONING METHODS

Main provisioning methods used

- **Chain-Ladder** remains the method used by all companies as a reference
- Most of the companies use (at least) another method to challenge the results of Chain-Ladder
  - Half of the participants also use **Bornhuetter-Fergusson** (BHF), 5 use the **average cost method** and 5 use **individual provisioning methods** (usually for large claims). Only one company mentioned the use of **regression methods capturing explicitly a calendar effect.**
  - Companies sometimes **combine the results of several methods**



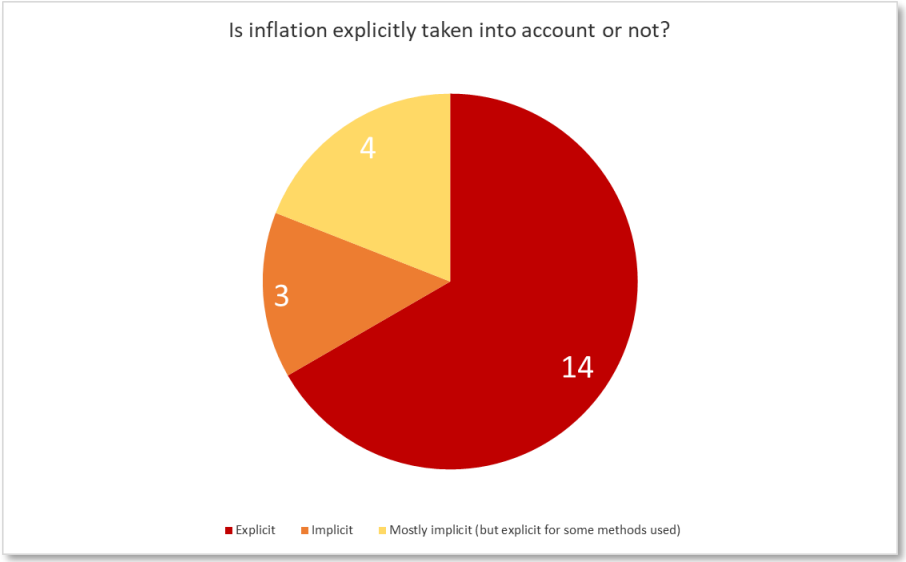
GLOBAL PROVISIONING METHODS

Inclusion of inflation in the global provisioning method (1/3)

- 14 out of 21 respondents have **explicitly** considered inflation scenarios in their global provisioning method
- For the 7 remaining participants
  - 4 of them **consider mainly the implicit future inflation** projected by their provisioning method ➔ 2 companies nevertheless apply a global correction (add-on) to account for past inflation until the end of 2022
  - 3 of them consider that the implicit inflation projected by the provisioning method is sufficient because they didn't observe impact of inflation in past data

REACFIN VIEW: implicit vs explicit impact

- We believe that, for some LoBs at least, it might be a bit optimistic to consider that there will be no excess inflation over the implicitly projected inflation or that inflation correction ➔ there might be a lag
- NB: we did not receive all the details of how the concerned companies reached these conclusions. They probably have strong arguments, but we were not able to verify them.



GLOBAL PROVISIONING METHODS

Inclusion of inflation in the global provisioning method (2/3)

- 14 companies are modelling an **explicit impact of future inflation**, with 2 main approaches.
- Most companies (10) use the **first approach**, 3 are using the second approach and one participant uses one or the other approach depending on the line of business.

Figure: Approach 1

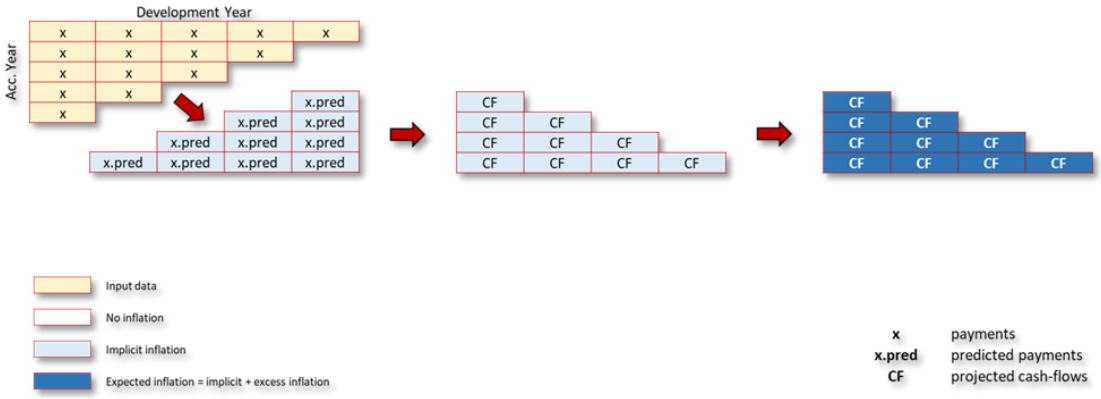
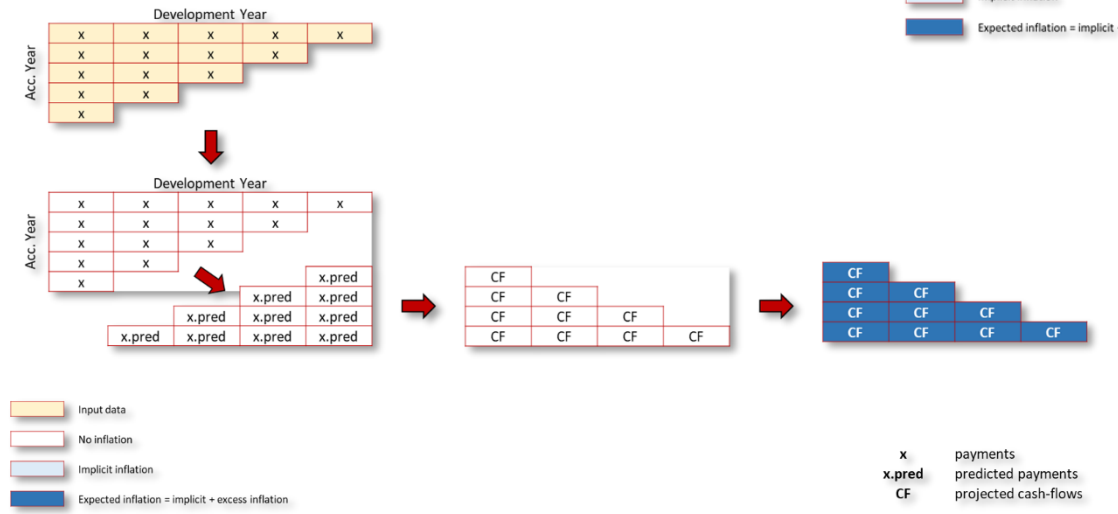
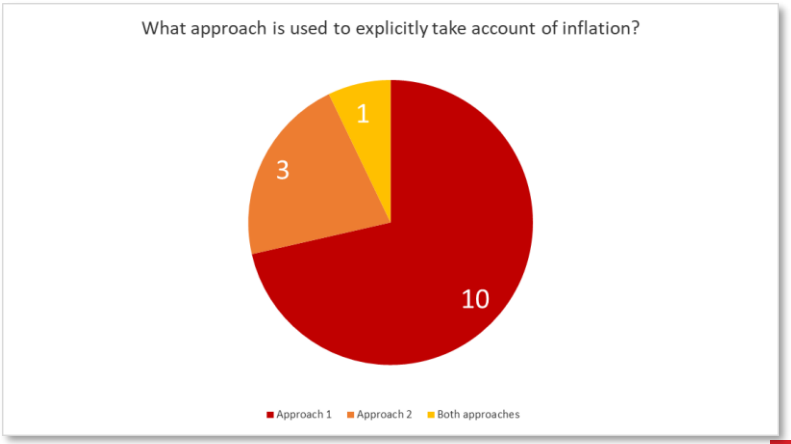


Figure: Approach 2





GLOBAL PROVISIONING METHODS

Inclusion of inflation in the global provisioning method (3/3)

- Additional findings
  - Several companies **do not apply any correction for short-tail LoBs** but only for long-tail business.
  - A few companies consider **expected changes in the indicative tables** in their future inflation estimation
  - A very limited number of companies use a **weighting factor** to consider that within a given LoB, the impact of inflation might differ depending on the type of claim
  - A very limited number of companies consider a **delay between the maturity of the expected inflation and the impact on their business**.

- Among the 7 companies **not using explicit correction** in their global provisioning method, we observe that:
  - 5 companies do not apply **any extra correction** in their global provisions (i.e., they consider that future inflation is equal to past implicit inflation) ➔ some of them have corrected their case reserves or are applying global corrections for some types of claims only (e.g., bodily injuries).
  - 2 companies apply **some extra global correction** as they consider future inflation is not the same as the past one ➔ global add-on not introduced in the triangles.

GLOBAL PROVISIONING METHODS

REACFIN VIEW: explicit correction approach

	Benefits	Limitations
Approach 1	• **No data treatment** required beforehand. • This method already **accounts for inflation** in the projections (implicitly calculated in the development factors).	• Difficult to make the distinction between implicit inflation and claims development. • No guarantee that the implicit inflation is correctly projected if the model does not account for calendar effects.
Approach 2	• This method makes a **clear distinction between the effect from inflation and the one from claims development**. • As there is no projected inflation, the excess inflation is here correctly applied.	• This method requires additional work and leads to new value of past data in the triangle at each update. • Specific attention should be brought to the inflation rates applied on the past payments.

It is also a good practice to **consider separately different types of claims when capturing inflation**.

This can be performed by **separating the data upfront** or by **using a weighting factor** calibrated from raw data.

GLOBAL PROVISIONING METHODS

How to ensure that the provisions capture inflation adequately?

- We asked the respondents how they **ensure that their claims provisions adequately capture future expected inflation**. They mentioned the following techniques:
  - **(Deeper) review of the largest claims** by the claims management department
  - **Regular monitoring** to check evolutions of the inflation correction factors and update them.
  - Deeper focus on the **choice of the method** to adapt to the impact of inflation on a specific LoB.
    - Use of **explicit approaches 1 or 2** to adequately capture expected inflation in the claims provisions.
    - Use **benchmarking with other models**.
    - Using the models on **paid triangles** and not incurred triangles to avoid double counting
    - A limited number of companies use models with an **explicit diagonal component** (i.e., separation methods).
    - Perform **back-testing**
  - Adequate measure of (the drivers of) past inflation and **estimation of expected inflation by type of claim**; sometimes they use more granularity than their classical LoB level (i.e., analysis by type of claims)

REACFIN VIEW: risk of double counting

- If case reserves are adapted to consider expected future inflation and if global provisions are estimated based on an incurred claims triangle, there is a potential risk of overestimation of the Best Estimate of claims provisions ➔ Companies should check carefully that there is no double counting.
  - Using paid triangles instead of incurred triangles (+ other method?) or
  - Using case reserves before correction of inflation in the incurred claims

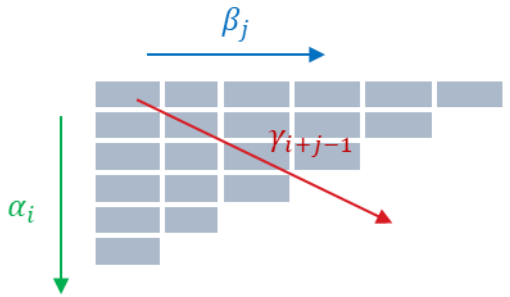
GLOBAL PROVISIONING METHODS

What are the methods to explicitly capture inflation

- Some actuarial methods have been developed in the past to explicitly capture the inflation in the run-off triangles
- Separation method

$$P_{ij} = C_i * r_j * i_j$$

  - C_i is the ultimate claim amount of accident year i
  - r_j is the proportion of payments done during development year j
  - i_j represents the calendar effect during year $i + j$ (e.g. inflation)
- Generalized linear models
  - Incremental payments are modelled using 2 of the following 3 dimensions:
    - Accident years (alpha): capture evolution of risk exposure
    - Development years (beta): capture payment pattern
    - Calendar years (gamma): capture inflation



- ICRFS
- Multiple-triangles methods

AGENDA

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- **Inflation indexes**
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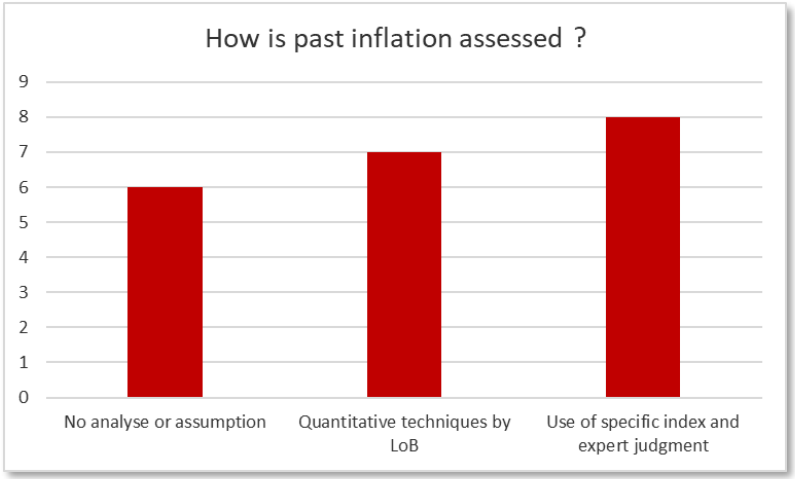
INFLATION INDEXES

Past inflation

- 7 respondents use **quantitative techniques** to assess past inflation by LoB. They use the following techniques:
  - Analysis of **evolution of average cost**,
  - Use of **separation methods** modelling explicitly the inflation
  - Some participants expect to refine this analysis by performing it on a more granular basis than the LoB.
- 8 participants assume that the past inflation follows a **specific index linked to a LoB**
- 6 companies do not perform **any specific analysis** or do not use **any assumption on past inflation.**



REACFIN VIEW: assessment of the past inflation

- When an implicit inflation is extracted from the triangle, one should ensure that there is **no business volume effect**. Indeed, business growth might lead to an overestimation of the implicit inflation.
- To this purpose, an **average cost method** (using claims numbers and claims costs triangles) would be better suited to separate inflation and business volume effects.

INFLATION INDEXES

Reference index - Luxembourg

Index	Property	Liabilities	Material Damage
Construction index	x		
General index (sub-components)		x	x
Wage index	x (with constr.)		
Cost type index			x
Specific index			x (Informex)
Other sources/countries			x

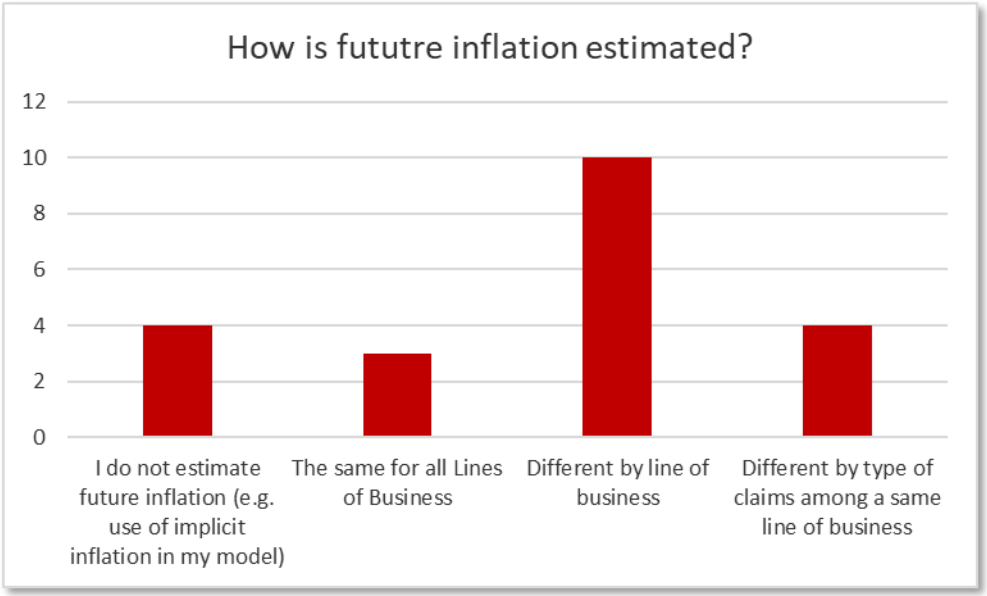
- Additional comments (Belux)
  - Some companies use an index for the first few calendar years and another one for the following (e.g. In MTPL: CPI the first n years and health index afterwards).
  - Observe a **delay between the evolution of their reference index and the real impact on their claims**. ➔ A limited number of companies therefore considers a lag between inflation index and the real impact on their expected claims cash-flows.

INFLATION INDEXES

Estimation of future inflation

- Only 3 companies use the same expected inflation for all LoB
- 10 participants use different inflation rates depending on the LoB
- 4 companies go beyond the LoB level and use different inflation expectations by type of claims among a given LoB

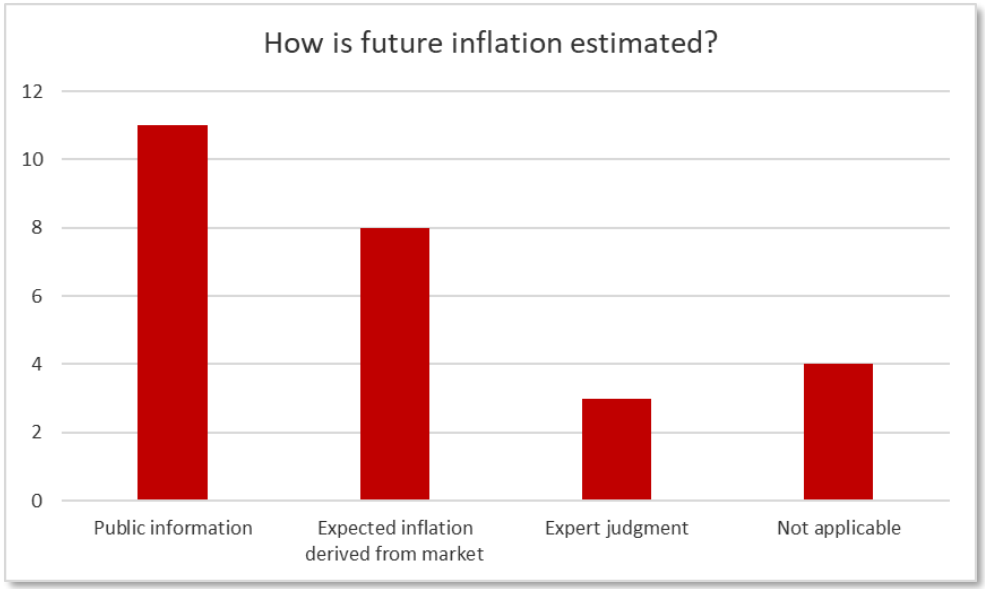
- For bodily injuries, several companies use expert judgment to **assess the impact of the evolution of indicative tables in 2028.**
- A company uses **multiplicative coefficients** derived on other markets for estimating the specific inflation by LoB with respect to “central inflation assumptions”.



INFLATION INDEXES

Estimation of future inflation – Basis inflation

- When estimating future basis* inflation, companies use one or several of the following sources of information:
  - Public information from NBB, Statec, BCE or EIOPA (11 companies).
  - Expected inflation derived from markets (e.g. inflation swap) (8 companies).
  - Expert judgement (3 companies). These expert judgements are nevertheless usually based on the observation of other indicators (e.g. Informex indexes).
- There is a need to **estimate inflation for further calendar years** as public information are usually available for the next one or two years only.



* We define the basis inflation as the market inflation that can be estimated for the future (typically CPI or Health index for Belgium).

INFLATION INDEXES

Estimation of future inflation – Spread over basis inflation

- Most of the companies use only this basis inflation (10) or do not estimate future inflation (4).
- Nevertheless, some companies use a **spread above the future basis inflation on some LoBs** in order to capture the "true" inflation of the LoB. This spread is
  - Either **calibrated historically** (5 companies).
    - Based on the historical spread between the LoB specific past inflation and the past basis inflation.
    - LoB specific past inflation might be measured on the LoB claims or based on a reference index
  - Or calibrated by **expert judgment** (2 companies)
- Some companies envisage to analyze the historical spread on their own data and/or on a more granular basis than LoB level.

REACFIN VIEW: future inflation assumptions

- It is a good practice to **identify a reference index by LoB** or by type of claim inside a given LoB
- The **assessment of the spread** between this reference index and the "true" inflation allows to better capture the specificities of the business but is difficult in practice
- Using **public information in combination with market data** seems to be the best way to proceed ➔ potential need to assess the spread between LoB reference index and projected basis inflation

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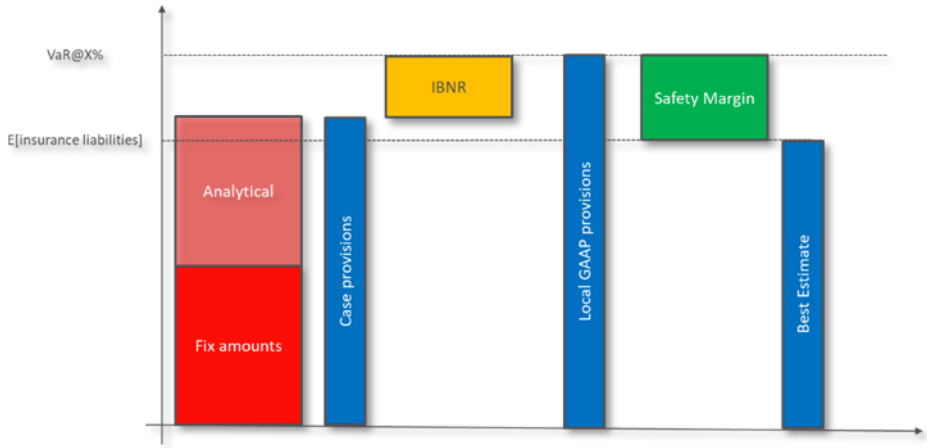
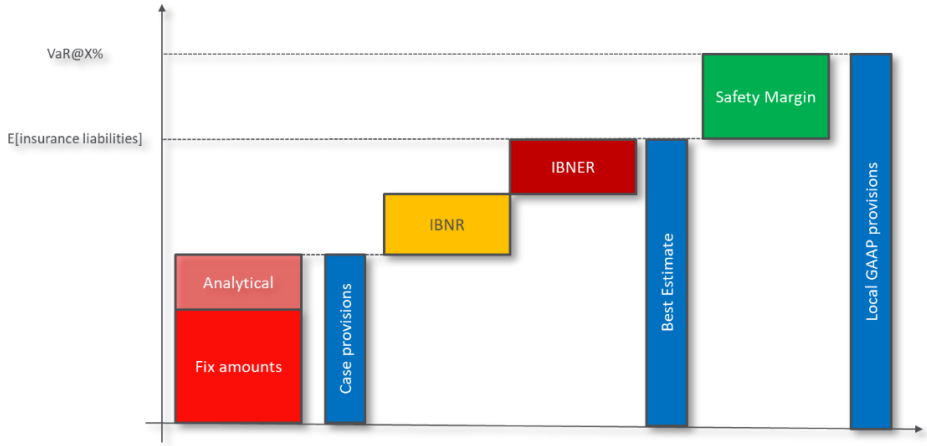
- **Local GAAP**

LOCAL GAAP PROVISIONS

Prudence in the local GAAP provisions

- 9 respondents confirmed that their **safety margin is implicit** (level of prudence in their case reserves)
  - Opening case reserves include a safety margin and claims handlers apply prudent guidelines for the case reserving.
  - A minority nevertheless compute the **distribution of their undiscounted best estimate** and check that their local GAAP provisions reach at least a **target quantile**
  - Some also apply sensitivity testing or define a buffer
- 12 respondents indicate that **their margin is explicitly managed**.
  - The majority computes the **distribution of their undiscounted best estimate** and check that their local GAAP provisions reach at least a **target quantile** and/or (ii) book an **additional global provisions** to reach their target quantile.
  - Some participants define their margin as a **percentage of their best estimate**.





LOCAL GAAP PROVISIONS

REACFIN VIEW: distribution of the best estimate

- We believe that it is a good practice to estimate the **distribution of its Best Estimate** even if there is no explicit calculation of a safety margin for the local GAAP provision.
  - It allows to assess where local GAAP provision lies with respect to the Best Estimate.
  - This gap between both provisions might be subject to a target level (e.g. defined in the company's Risk Appetite).
- To this purpose, different methods are available:
  - Using a **parametric distribution** (e.g. Log-normal) where you can specify the standard deviation.
    - We believe that the **Mack model is more appropriate** than using the Solvency II Standard Formula parameters.
    - Indeed, the objective here is to capture the volatility at ultimate view, while the Solvency II Standard Formula captures the one-year volatility only.
  - Using a **bootstrap** method.
    - In that case, you must be careful that your **model correctly includes the different sources of uncertainty**: process risk, parameter risk and model risk.
    - Such methods also allow to incorporate inflation scenarios.

LOCAL GAAP PROVISIONS

Evolution of the margin

- If their current local GAAP provisions include a sufficient safety margin,
  - 5 companies considered (at the time when they answered the survey) **absorbing part of the increase** of the best estimate (due to inflation) by a decrease of their level of confidence (if their updated local GAAP provisions are still above the target quantile they have defined).
  - 5 companies didn't know yet at the time when they answered the survey.
- The goal of these companies would be to **limit the (local GAAP) P&L impact** of inflation.

- The methods mentioned to reduce the margin are the following:
  - In case the margin is booked as a separate global amount, simply reduce this amount accordingly.
  - When the safety margin is included in the case reserves:
    - adapt the past opening reserves to reduce the margin they contain
    - reduce the buffer in the case reserves for large claims.

- The other 11 companies expected to **maintain their margin like** the period before high inflation (e.g. similar ratio local GAAP / Best Estimate) and were ready to take the full P&L impact.

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