

European Motor Report

October 2022

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Introduction

In Europe, in 2020, the European Automobile Manufacturers' Association estimated the total number of vehicles in Europe close to 280 million for that year, with a total insurance market premium amounting to EUR 149.4bn, for a total of EUR 107bn in paid claims. This includes premium and claims for both third party liability and first party damages. For the rest of this note, we will concentrate on the Motor Third Party Liability (MTPL) insurance.

With QBE Re having a presence in almost 50 European countries, there is access to a wide variety of statistics, specifically on the larger motor losses. Making the most of those statistics, we construct many 'country-level' pricing models. As of today, 15 such models have been developed, which result from a collaboration between our underwriters, actuaries, and claims adjusters etc.

Throughout this note, we want to offer the reader an insight into European MTPL modelling, what the models can independently teach us and the way they differ from one another.

After a first section detailing our pricing methodology and revealing the key findings from our 2022 models, we will tackle what is surely the hottest topic in the market today: inflation. Using our internal inflation forecasts, we will investigate the impact of inflation in our models, offering our view on how the reinsurance market should respond to this sole variable.

The last section will cover the Covid-19 pandemic and its impact on the motor insurance and reinsurance markets. We have analysed data from the last two years and offer our findings in order to put forward a prospective approach to the motor liability reinsurance market.

Finally, based on the conducted research we conclude with our outlook for the market in 2023.

General comparison of Motor Liability in european countries

Collective risk model

To model the yearly incurred claims amount of a given MTPL portfolio, the methodology followed by QBE Re refers to the Collective Risk Model theory. One of the main assumptions of this approach is the independence between claims frequency and severity. While the MTPL claims frequency is modelled based on a Poisson-distribution, the severity is modelled by combining experience and a parametric distribution.

By multiplying the average cost with the expected number of claims, we obtain the expected incurred amounts, or burning cost, of the reinsured MTPL portfolio.

This approach is constructed on a market scale to get high-level views but is refined during the pricing of individual portfolios to recognise the different risk profiles between reinsured companies.

As this modelling mainly rests on observations of prior years, we need to know how those past years compare to today. In order to compare experience from different accident years, past claims must be inflated and developed to ultimate to obtain the expected final amounts, a process often called 'on-levelling'.

To compute the indexation for the MTPL claims, we consider the published wage inflation for the territory concerned and add a superimposed component. Wage inflation is a crucial driver for large claim modelling as it represents the loss of earnings as well as the cost of care, which is generally measured in the salaries of care professionals.

Claims frequency

In this 'as-if' logic, past observed claims frequencies, meaning the observed number of claims above a given threshold, are adjusted to reflect the current market conditions.

With company portfolios being in a constant state of flux, changes in vehicle numbers are used to rescale past claims frequency observations. For example, if two claims were observed on a portfolio of 1m covered vehicles, the logic is to expect four claims for a similarly composed portfolio of 2m vehicles.

On top of that, a 'Frequency Index' is also applied to reflect the changes in road security, driver behaviour and general 'risk' awareness of the population. Indeed, the European Road Safety statistics shows that, in the long run, a downward trend in the number of casualties and severely injured parties in road traffic accidents. This trend must be factored in when pricing MTPL reinsurance treaties.

The following graph shows the changes in claims frequency across a number of European countries over the last ten years.

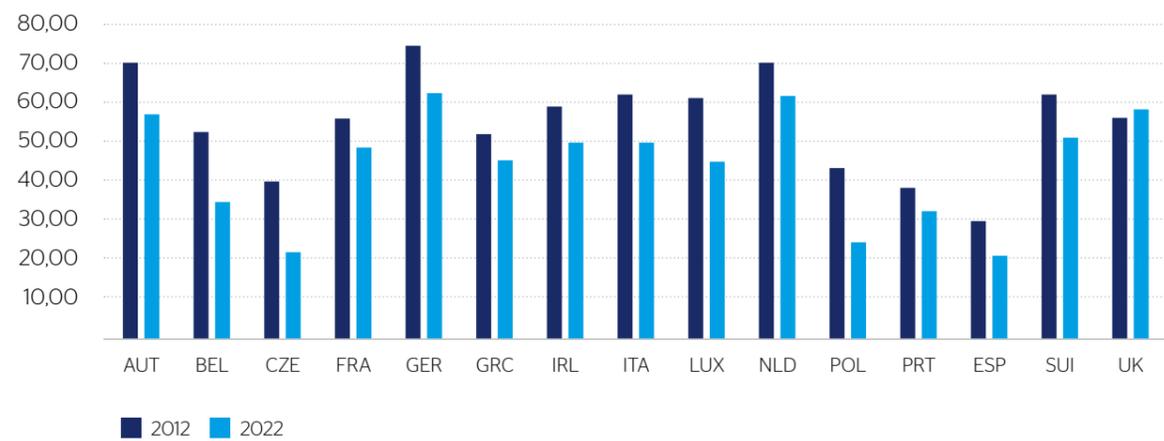
When calculating the expected claims frequency for a future treaty period, the observed historical numbers are used after correcting the individual values with this index. For example, in the UK, for every claim observed in 2002 we would only expect as 0.58 claims in 2022, all other things being equal.

For each of the fifteen European countries studied, a collective risk model is constructed. Combining frequency and severity distributions, the expected number of claims

can be calculated for any amount higher than the modelling threshold. Each market model has a specific modelling threshold, and as excess of loss treaty reinsurance focuses mostly on large losses, only claims above this level are considered when constructing the models.

Representativity of our models varies from 20% to 95% with an average of 60% depending on the data collected on the markets.

Evolution of severe bodily claims from 2002 to 2022. Basis 100 = 2002

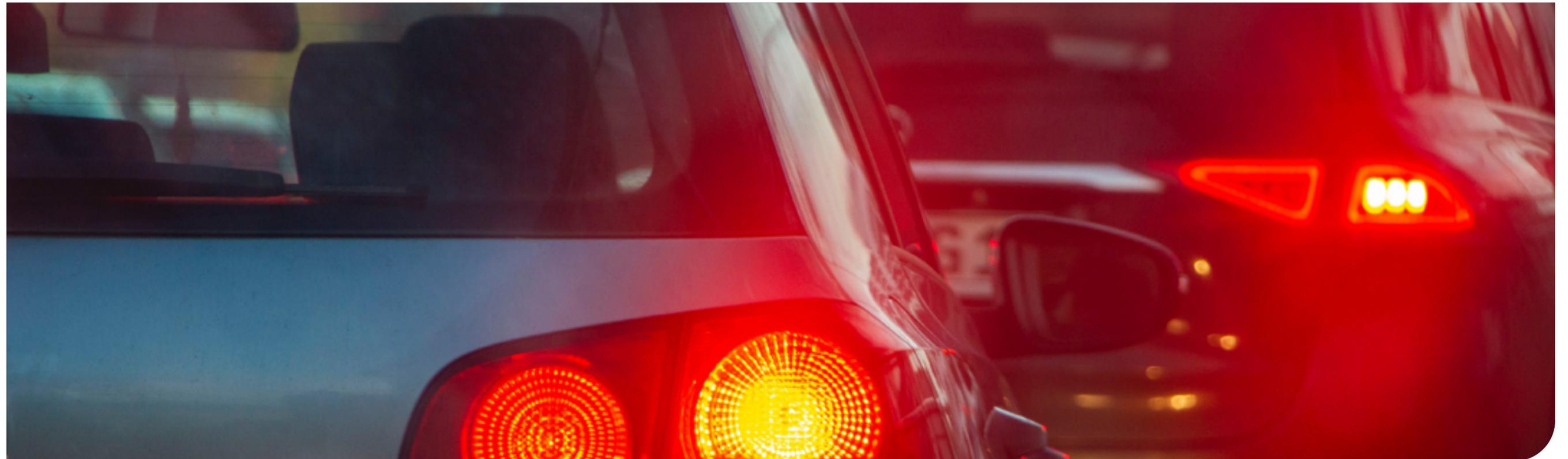
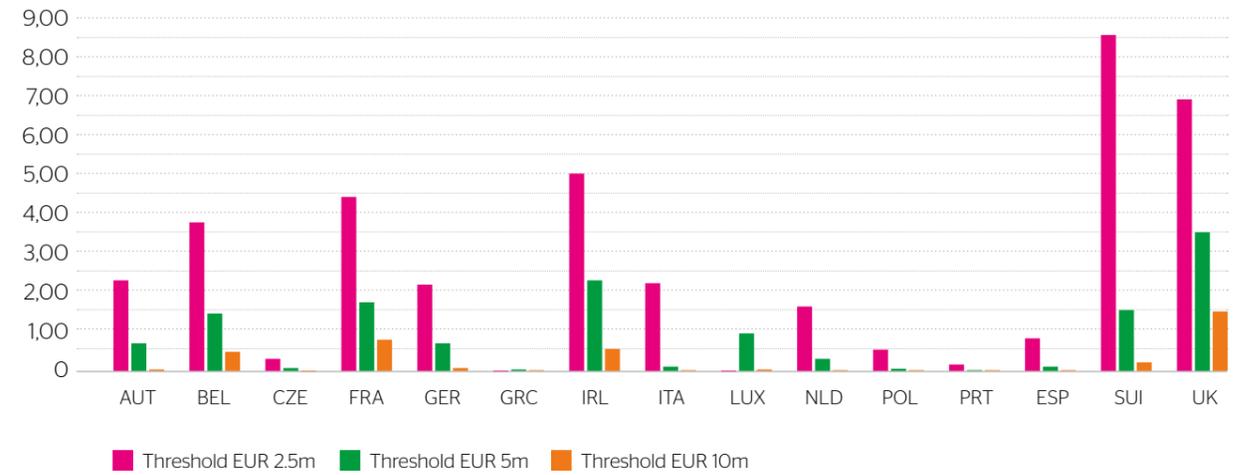


European frequencies

The following graph displays the expected number of claims above three thresholds, based on our fifteen European MTPL Market Models.

To make things comparable, those number are rescaled on a similar exposure of one million vehicles.

Expected number of claims for an exposure of 1,000,000 vehicles



The following table shows the calculated return periods for claims above the different thresholds. The return period is defined as the average time between events. Referring to the following table, at a market level and for an exposure of 1m vehicles, we estimate a claim of EUR 10m or more to occur once every twenty years in Austria.

Return periods (years)

Thresholds	EUR 2.5m	EUR 5m	EUR 10m
Austria	0.43	1.47	19.88
Belgium	0.26	0.70	2.86
Czech Republic	5.63	55.46	>100
France	0.23	0.59	1.35
Germany	0.47	1.53	9.86
Greece	36.35	>100	>100
Ireland	0.20	0.45	1.85
Italy	0.47	12.20	>100
Luxembourg	-	1.13	16.02
Netherlands	0.61	4.46	90.89
Poland	2.29	16.37	>100
Portugal	9.55	70.95	>100
Spain	1.38	8.40	47.54
Switzerland	0.12	0.68	5.15
UK	0.14	0.28	0.70

It is important to note that those models only incorporate domestic claims. A green card claim, where a domestic driver has an accident in a foreign country, can amount to a much higher sum than a comparable accident occurring domestically and involving only locals. These claims are tackled in a separate model and are not incorporated in this study.

Similarly, accidents involving an unusual number of claimants or a high proportion of material damage costs are removed from our models and treated separately.

According to our models, for a similar portfolio profile and identical number of vehicles, Switzerland is expected to be the country with the highest frequency of claims above EUR 2.5m with the UK and Ireland following. We observe huge variations in our results between different European countries. These differences strongly depend on the socio-economic situation, legal compensation systems, and safety regulations etc., making collaboration with our legal expertise crucial for understanding all the market specialities.

Looking at France, we expect a EUR 10m claim to occur almost every year whereas in Belgium we expect a claim of the same level only every three years. In Spain, it is close to once every 50 years and, in Greece, the probability of such a claim are calculated to be almost nil.



Duration

The medical uncertainties and heavy legal processes that might arise are the reasons the estimation of severe bodily claims can take a considerable amount of time to settle.

Typically, these are the claims reinsurers are confronted with in the MTPL excess of loss treaties. Payments on these claims are often quite slow and only materialise gradually. This is even more the case for claims that are paid as annuities or PPOs (Periodic Payments Orders).

Two elements that play a key role in the speed of settlement are the medical progress of the claimant and the time it takes to finalise legal proceedings. The type of injury has a large impact on the uncertainty of the medical situation and hence on the ultimate expected claims amount and speed of settlement. The uncertainty is particularly important for bodily injury claims with young victims (under 18 years old).

The court proceedings will take longer for MTPL claims that potentially cost several million Euros since finding an agreement between the MTPL insurer of the liable party and the representatives of the claimant can take a long time. Experts are often consulted for advice and appeal proceedings are not uncommon for these types of claims. The payment rate is thus usually slower the higher the claim amount.

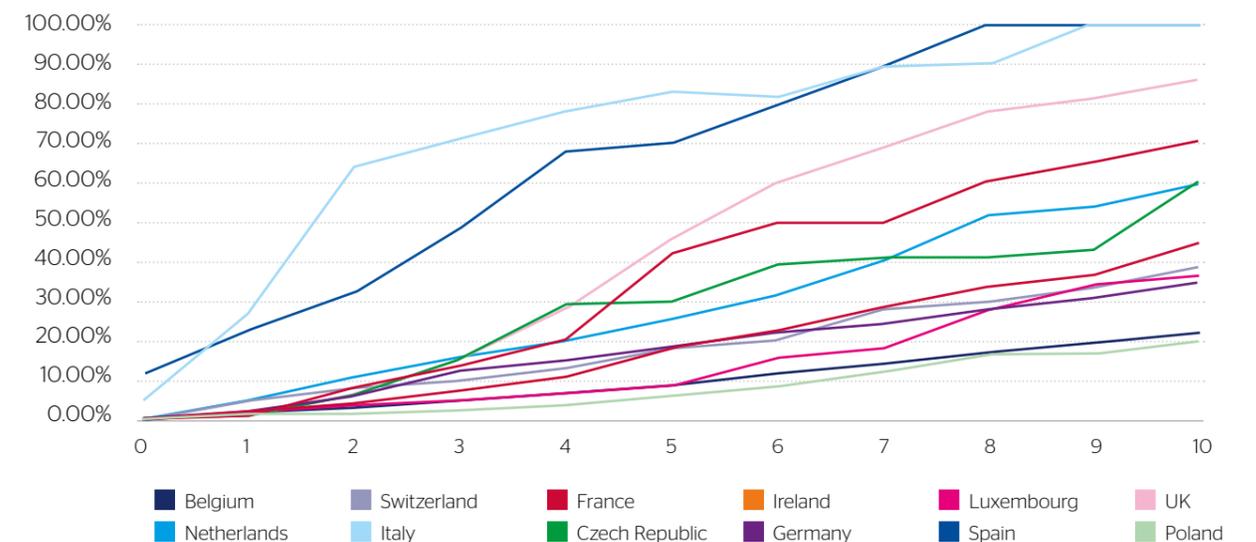
The speed at which a claim is settled is however also very different across Europe. The following graph displays the average payment pattern for claims higher than EUR 5m. These results are based on observed data, not modelled data.

Spain, Italy, and the UK are the countries where the claimant is generally most quickly compensated. Two years after the accident, claims are usually 65% paid on average in Italy. After five years, it's close to 80% paid. By way of comparison, in Belgium, we observe that claims are 3% paid and 10% paid on average after two and five years respectively.

After ten years, the differences are even more pronounced with the average paid proportion going from 20% in Poland to nearly 100% in Italy and Spain, with the other countries evenly spread in between.

The payment pattern can have a big impact on treaty indexation. The longer it takes for a claim to be settled, the longer the claim is subject to inflation. In most markets, this problem is countered by the stability or indexation clause, a specific reinsurance contract tool that will evenly share the burden of inflation between reinsurer and reinsured by adjusting the limit and deductible of the treaty layer.

Average payment pattern for claims larger than EUR 5m



Development to ultimate

If it can take a claim a very long time to be settled, it could be because its final amount is highly uncertain and depends on many variables both within and outside of the claimant's condition.

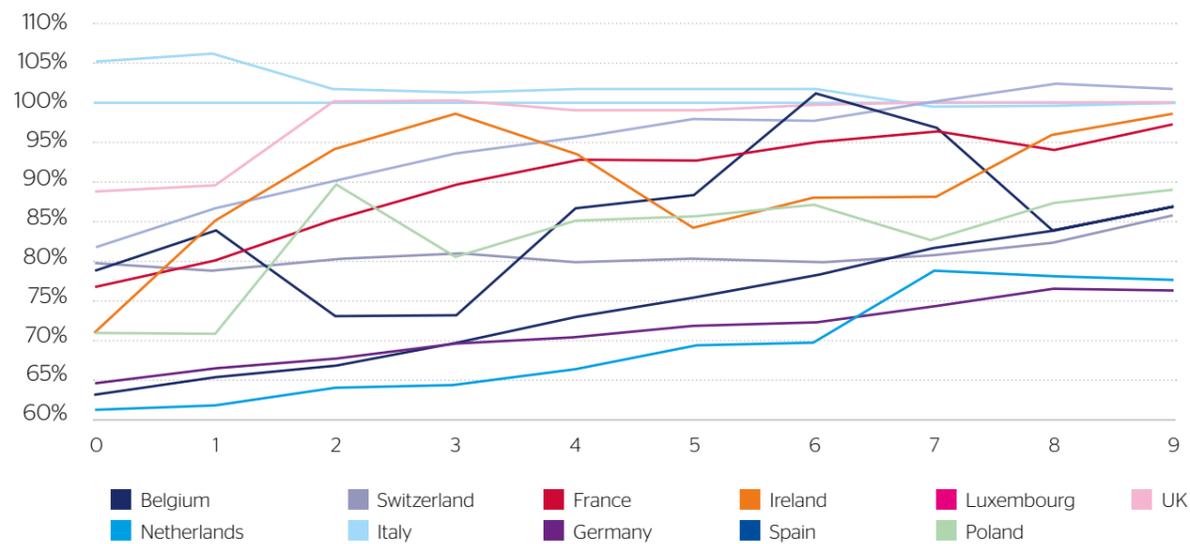
This uncertainty will tend to decrease as the claim matures, with the claimant's medical situation stabilising and the legal proceedings nearing conclusions. Before settlement however, the claim's incurred value shall remain an estimate.

The following graph displays, for claims larger than EUR 5m, the average reserved amount compared to the ultimate claim value. As for the duration, the following graph is not based on modelling, it is a pure statistical observation, sometimes based on little data in those countries where a EUR 5m claim is rather uncommon. The volatility therefore should be kept in mind.

In the Netherlands, claims are on average reserved at 60% of their final value for the first year of the life of the claim, which is the lowest in our whole sample. It is important to notice that legal changes in the social security and discount rate can have a huge impact on this curve as in the case in Belgium with the successive changes to indicative tables in 2001, 2008 and 2012. Those tables, used as the basis for compensation standards in bodily injury claims, change regularly and heavily impact the reserves by, among other things, lowering the reference discount rate.

Overall, in Europe, we observe a general tendency to under-reserve claims. We can see that even after 10 years in the Netherlands, claims are still on average reserved 22.5% below their final value.

Evolution of the evaluation compared to ultimate situation for claims larger than EUR 5m



Inflation forecasts and their impact on the models

Inflation measure

As previously explained, a large part of the reinsurance pricing process is the on-levelling of past observed claims considering the renewal year's expected socio-economic context. As we saw in the previous chapter, the observed number of claims is corrected with the frequency index and rescaled for the new exposure, but the claims value must also be adjusted, specifically to inflation.

To that end, two measures are essential to the model: the wage inflation and social or superimposed inflation.

Using wage inflation to rescale prior year claims makes sense for severe bodily injury cases where most of the compensation will be directly linked to the claimant's loss of earnings and the cost of care (generally comprised of the salaries of caregivers). However, it has become clear that wage inflation alone does not perfectly represent the inflation of the average large claim observed in the market. There are other variables at play such as technological progress, improved medical knowledge, and potential legal

changes that will drive the costs upwards. This element is the 'social' or 'superimposed' inflation.

To illustrate this notion, let's refer to the following graph that plots the average claims cost over the past twenty years against wage inflation in Belgium. It is important to notice that the previously mentioned effects of indicative table changes have been neutralized, meaning the evolution displayed here is net of those major legal changes. With it, the observed superimposed inflation would be even higher.

Looking at the graph, it is undeniable that wage inflation alone is insufficient to on-level past losses to an appropriate current value. A way to correct this is using an annual social inflation of +1.5% on top of the basic wage inflation. With this hybrid inflation measure, we are sure claims amounts from different accident years are comparable and representative of what a similar claim would cost should it occur during the renewal year. Social inflation analysis is undertaken for all European Countries.

Comparison between observed inflation and wage index on MTPL claims in Belgium



Inflation impact on reinsurance pricing

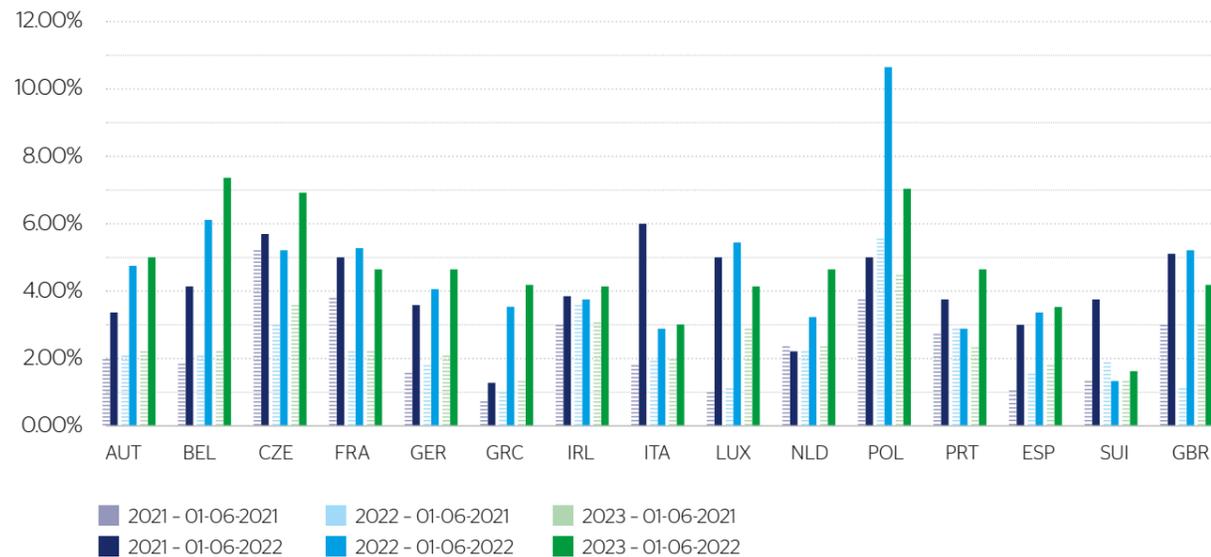
Inflation is arguably the top trending topic in (re)insurance at present. In the excess of loss reinsurance context where limits and deductibles are fixed, the gearing effect can be very pronounced.

Let's refer to the OECD's June 2022 wage inflation projections and compare them to the corresponding June 2021 forecasts.

Our annual pricing process must always include adding one extra year of inflation to the prior year claims and correcting for potential errors in prior inflation forecasts.

This process is an absolute necessity to ensure our models are always up to date and duly represent the current economic framework. In recent years inflation has for the most part been stable and low in Europe, which in turn has resulted into light adjustments in our models and a small impact on our pricings.

Wage inflation - OECD projections June 2021 vs June 2022



However, we face a different situation in 2022. Looking at the graph, we see that 2021 OECD forecasts for the wage inflation in 2022 were a lot lower than the corresponding forecasts published in 2022. Taking France as an example, one can compute the following values:

France	Index 2020	Inflation 2021	Inflation 2022	Inflation 2023	Index Pricing year
06/2021 forecasts	100	3.69%	2.27%		106.05
06/2022 forecasts	100	5.19%	5.37%	4.84%	116.20
Impact on 01/01/2023 renewal					9.57%

The original OECD forecast for French wage inflation in 2021 was 3.69%; the latest forecast is 5.19%, meaning a 1.49 percentage point difference. In 2022, the difference between last year's forecast and the current one is 3.1 percentage points while for 2023 we have a current forecast of 4.8%. Therefore, whilst we might usually see 'year on year' inflation uplifts of between +1% and +3% in Europe, for France in 2022, we see a cumulated inflationary uplift of +9.57% over the 2021 result.

In Belgium, the same analysis gives us an inflationary uplift of a little over +14%, which means all claims are expected to cost significantly more than was estimated in 2021.

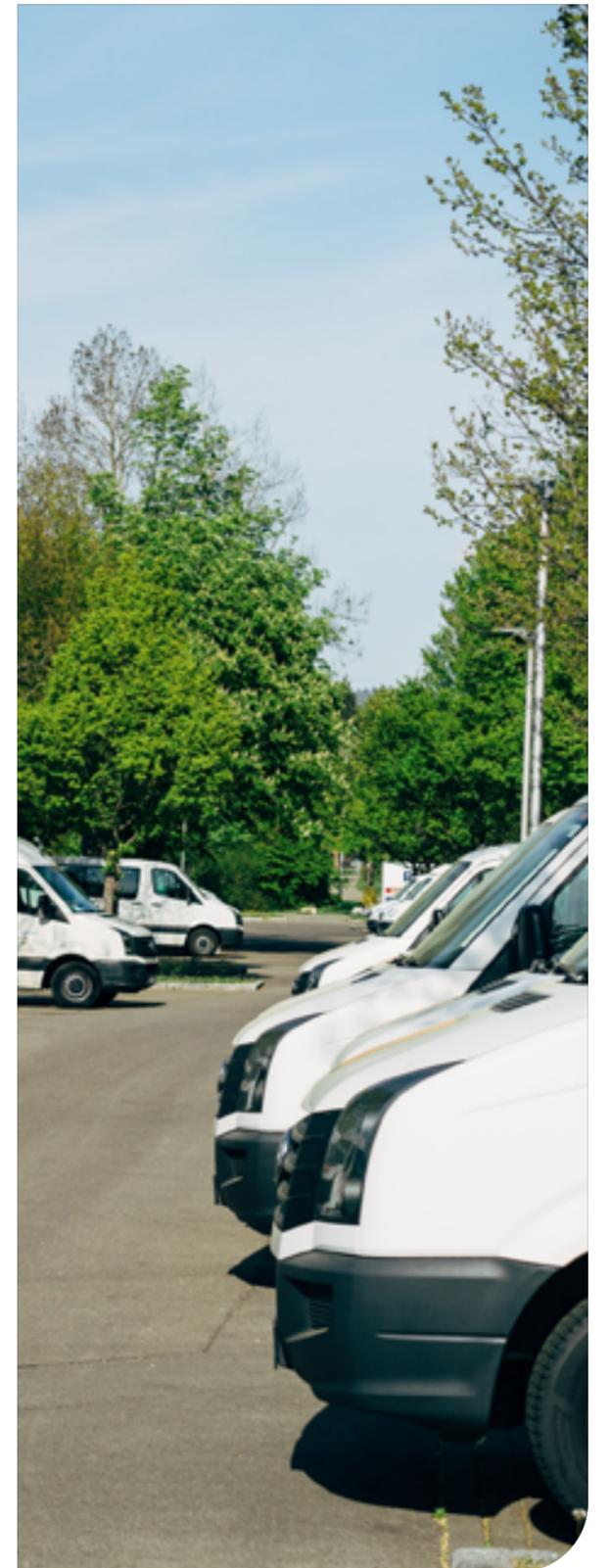
These inflationary uplifts however do not directly translate to the increases we expect to see in the burning cost in excess of loss reinsurance layers. Due to the gearing effect, also known as leverage effect, the impact on excess of loss layers can be much greater. Let's take the following example, illustrated in the below table, where we have 6 claims of various amounts during the year, and see how much is paid by the XoL reinsurers:

	Forecast to 2022	xs EUR 1m	xs EUR 2m
Claim 1	500,000		
Claim 2	750,000		
Claim 3	1,000,000		
Claim 4	1,500,000	500,000	
Claim 5	2,500,000	1,500,000	500,000
Claim 6	5,000,000	4,000,000	3,000,000
Total	11,250,000	6,000,000	3,500,000

For a reinsurance layer Unlimited xs EUR 1m, the total claims amount paid by excess of loss reinsurers would be EUR 6m. For a layer Unlimited xs EUR 2m, XoL reinsurers are paying EUR 3.5m.

Now, let's assume that there has been 10% inflation during the year. As a result, the exact same six claims occur but are now expected to cost 10% more.

Stable layer	Forecast to 2023	xs EUR 1m	xs EUR 2m
Claim 1	550,000		
Claim 2	825,000		
Claim 3	1,100,000	100,000	
Claim 4	1,650,000	650,000	
Claim 5	2,750,000	1,750,000	750,000
Claim 6	5,500,000	4,500,000	3,500,000
Total	12,375,000	7,000,000	4,250,000
Change with 2022	10%	16.67%	21.43%

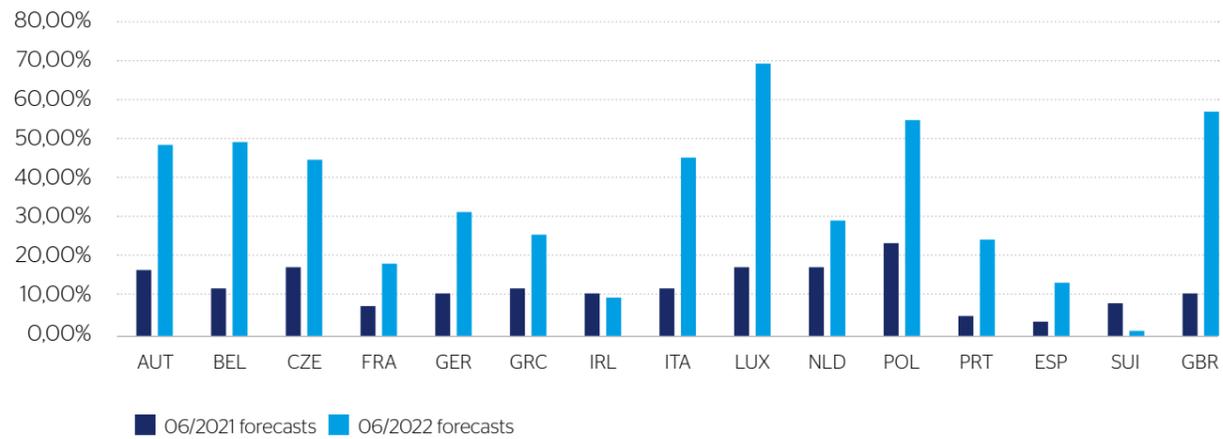


After inflation, the Unlimited xs EUR 1m layer has EUR 7m of incurred claims, or a 16.67% increase on the pre-inflation total, whereas for the layer Unlimited xs EUR 2m the increase on the pre-inflation incurred is 21.43%. We can see that the higher the attachment point of the layer, the greater the impact of the gearing effect and the higher the increase in our burning cost as a result of inflation.

The following graph displays the change in burning cost given by our models after inflation to the renewal year 2023 for a layer Unlimited xs EUR 5m. Two situations are compared,

one where the June 2021 inflation forecasts are used, the other where we use the latest projections. Those values take account of a classical stability clause (or index clause) with a margin of 10%. The stability clause is meant to distribute the effects of inflation between insurer and reinsurer.

Inflation impact on Pure Premium - Layer Unlimited xs EUR 5m



It is important to note that the above graph only shows the impact of inflation, no other changes have been made such as updates to the frequency index. The comparisons are made on a burning cost basis, meaning the expected loss costs burden to the layer while, usually, reinsurance pricing is based on rates applied to the written premium. In that case, changes in original insurance rates would also impact the changes in reinsurance rates charged.

Usually, if a reinsurance programme structure remains constant year after year, the inflation translates into small rate increases

in the market. This year, however, inflation levels are so high that reinsurance buyers might want to consider their options. One of them could be adapting with the stability or indexation clause.

The above-mentioned example is computed using 2023 as the stability clause basis year, meaning the year we start sharing the inflation between reinsurer and reinsured. Using the treaty inception year as the base date is relatively standard practice but let us look at the impact of changing it to 2021 or 2022. A layer of Unlimited xs EUR 5m is kept as a reference for comparisons.

Stability clause basis year impact on Pure Premium evolution - Layer Unlimited xs EUR 5m





Keeping the basis year in 2022 or 2021 has a big impact on the burning cost difference. For instance, in Belgium, one can observe a substantial decrease in the layer Unl. Xs EUR 5m: going from +50% with 2023 as the base date to +30% when changing it to 2022 and a little below +10% with 2021.

The stability clause allows for a mitigation of the gearing effect. Going back to the previous example, we can see what would happen if the reinsurance treaty had indexed the deductible to the same level as the claims:

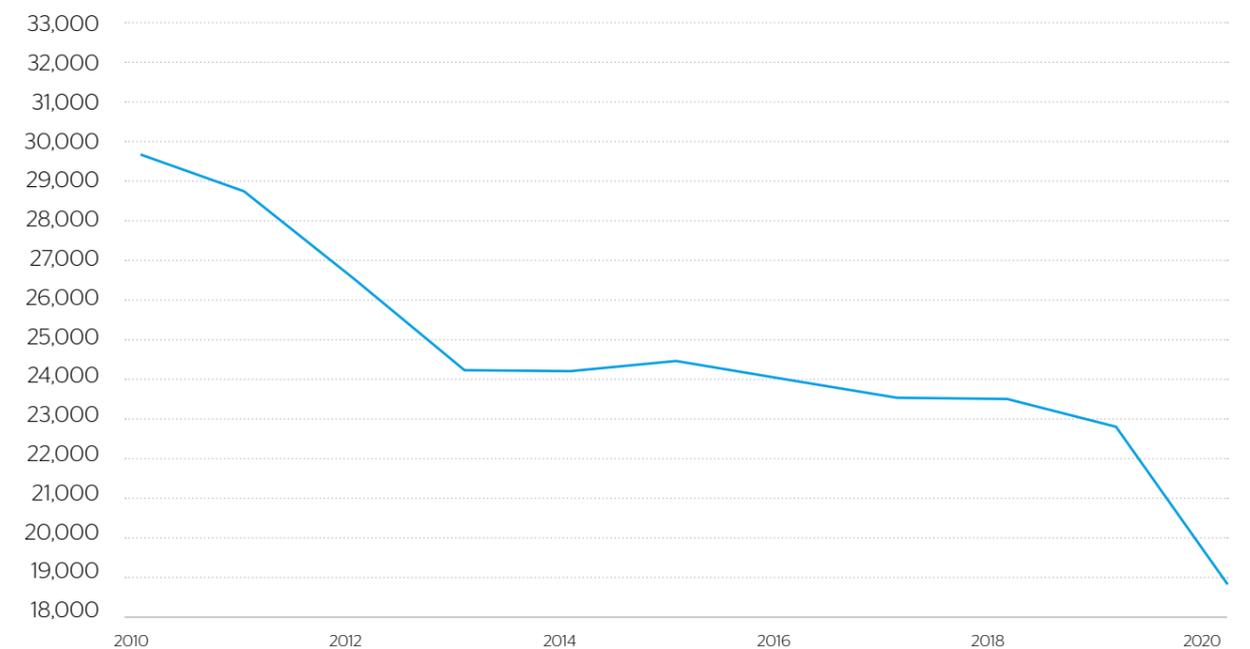
Indexed layer	Forecast to 2023	xs EUR 1.1m	xs EUR 2.2m
Claim 1	550,000		
Claim 2	825,000		
Claim 3	1,100,000		
Claim 4	1,650,000	550,000	
Claim 5	2,750,000	1,650,000	550,000
Claim 6	5,500,000	4,400,000	3,300,000
Total	12,375,000	6,600,000	3,850,000
Change with 2022		10.00%	10.00%

The change compared to the previous year is now reduced to the level of inflation which, if correctly impacted in the original insurance rates, resorts to a stable rate for excess of loss reinsurers.

Covid-19 and its impact on the market

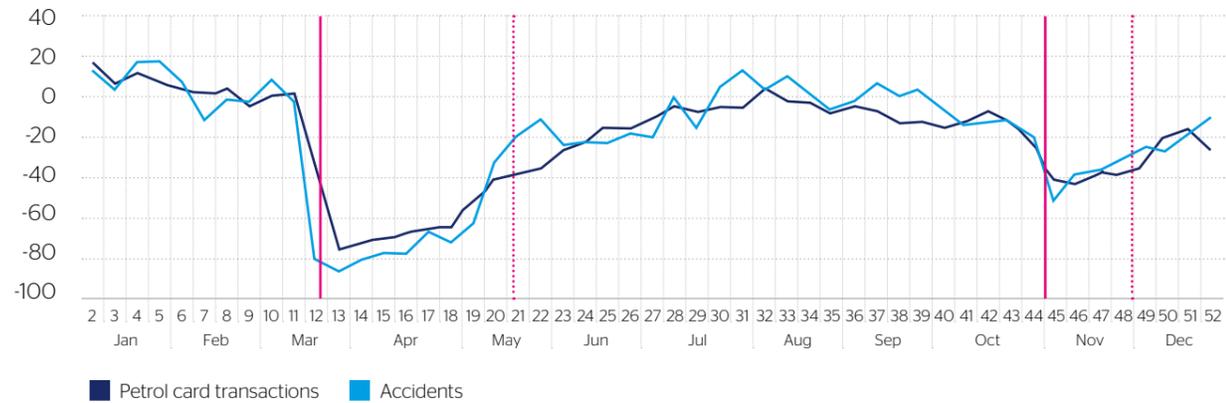
COVID-19 has had a severe impact on the automotive and mobility industries, and therefore on motor insurance and reinsurance. The strict lockdowns associated with the pandemic led to a sharp decrease in traffic volumes, and therefore claims frequency. In the EU, the average distance driven dropped by 30% with a 17% decrease of road traffic accidents in 2020 compared to 2019. The reduction in traffic congestion varied between -25% and -75% in different European countries with the highest decrease of -75% occurring in Spain, France and Italy. The subsequent impact on motor claims frequency depended on each country's specific approach to lockdown and the implemented governmental measures.

People killed in road accidents in the EU, 2010-2020



Source: CARE database (the Community database on road accidents resulting in death or injury); Ireland, Malta and Sweden: 2020 data from the regional data collection

Comparison of the weekly amount of card transactions for petrol and the weekly number of bodily injury accidents in France in 2020 on a year-on-year basis (%)



However, it has been witnessed that the reduction in traffic can negatively affect driving behaviour and lead to misconducts such as excessive speeding, mobile phone use and drunk driving. In some countries that registered an overall decrease in traffic violations, it is thought to be because traffic police were almost fully deployed to enforce Covid-19 measures and, as a result, fewer traffic offences were detected and enforced. The increase of empty road lanes and weak enforcement of speed limits resulted in more high-speed collisions despite the few numbers of vehicles on the road. The increased severity of the accidents resulted in non-proportional reduction in large claims comparing to the drop in traffic congestion. The Association of British Insurers (ABI) have provided data demonstrating that average pay-outs per claim rose during the pandemic, which confirms what we have seen in our market studies. It means that we cannot fully rely on the experience of the 2020 accident year as it is not truly representative of our expectation for the future.

Once the COVID-19 restrictions were lifted in 2021, there was a slow recovery on the roads as people increasingly chose to travel by car rather than by public transport due to health concerns. Claim volumes subsequently increased too but remained 20% to 30% lower than pre-pandemic levels. Traffic volumes became more spread out throughout the day as hybrid working became the new normal and 'rush hours' became less pronounced. Use of delivery vehicles increased as people increasingly took to shopping online

with purchases being delivered to their houses. Now that working from home is implemented in many companies, it creates new challenges on the roads. According to the findings of the motorway operator Sanef, 73% of drivers use their phones when driving, one out of ten for online meetings, sometimes even for video conferences. This kind of behaviour increases the risk of road accidents by 23%.

As for 2022, according to the Belgian Federal police, fatalities and injuries resulting from road traffic accidents are increasing compared to the Covid-impacted year of 2021. Week night collisions rose by 93% and weekend collisions by 157% in the first quarter of 2022 compared to the same period in 2021, with the number of accidents involving cyclists being the highest recorded in the last ten years in Brussels and Flanders. In France, the year 2022 also started with a 44% increase in road fatalities compared to the same 6-month period in 2021.

To conclude, our market data shows an increase in the frequency and severity of claims occurring in 2022 compared to 2021, however it is better to wait for the full annual data to draw our final conclusions. COVID-19 has influenced many changes in driver behaviour and mobility more generally which will have a direct impact on the claims seen by the motor (re)insurance markets. However, the question remains: how do we consider the experience of the accident years 2020 and 2021 given that the data suggests a recovery in traffic volumes during 2022 and the years to come?

Conclusions

After years of experience in the European motor reinsurance markets, QBE Re has developed a strong knowledge, understanding and database of statistics that were explored throughout this note. After explaining our pricing methods and the mathematical models we use, we compared the expected claims frequencies across Europe and noticed huge discrepancies from one country to another.

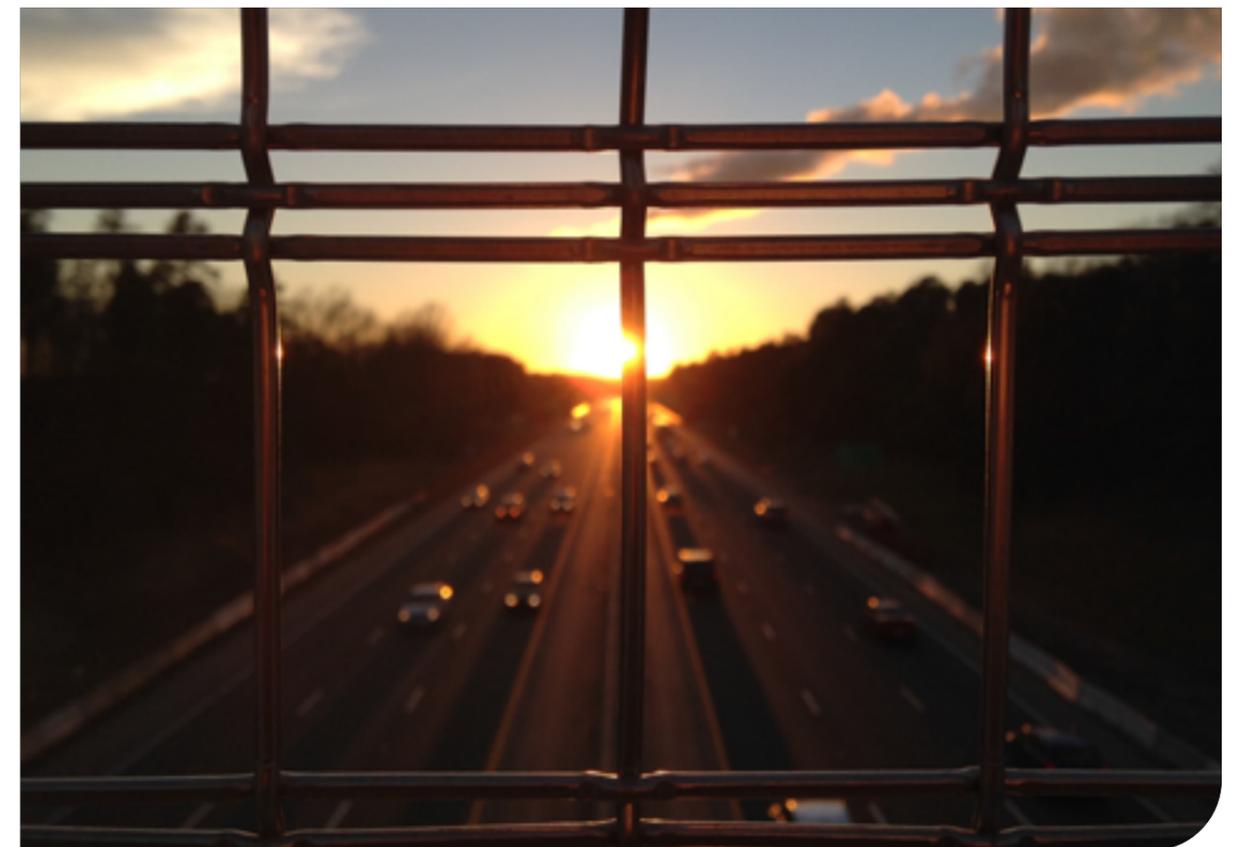
The goal of this note was to provide a solid base to make assumptions about where we are headed and how we can deal with the challenges that will occur in the next pricing period.

Using our models, we can estimate the impact of the high inflation environment we are currently experiencing, and the results appear drastic. Options are available to reinsurance buyers however, such as adapting the stability or indexation clause as we saw reinsurance rate changes

could be mitigated by simply changing the base date from 2023 to 2021, or even by increasing the deductible of the programme, with reinsured companies then keeping the same volatility in their portfolio.

All other things being equal, technical rate increases required will be significant next renewal. One could argue that due to Covid-19, the market has changed, and we might expect a decrease in motor claims frequencies. We do not believe this to be the case as most data, suggests a return to pre-covid traffic levels. In fact, in 2020, the number of road traffic accidents mostly returned to normal after the first lockdown, so we believe the impact of lockdown is really limited in time.

This renewal will certainly be challenging as reinsurers and reinsured will face the need to agree on the appropriate way to collaborate with each other in a fair and transparent manner.



¹ <https://wjes.biomedcentral.com/articles/10.1186/s13017-021-00395-8>

² <https://www.clarkwillmott.com/news/covid-19-lockdown-reduces-road-traffic-accidents/>

³ <https://www.actuarialpost.co.uk/article/higher-severity-motor-claims-during-pandemic-drive-up-costs-20335.htm>

⁴ <https://www.mckinsey.com/industries/financial-services/our-insights/insurance-blog/are-motor-claims-in-europe-about-to-rebound>

⁵ SANEF, Société des Autoroutes du Nord et de l'Est de la France is a motorway operator company in France.

⁶ <https://www.tf1info.fr/societe/securite-routiere-quand-le-teletravail-provoque-des-comportements-dangereux-au-volant-2200115.html>

⁷ <https://www.eltis.org/in-brief/news/road-accidents-rising-belgium-post-covid>

⁸ <https://www.latribune.fr/entreprises-finance/services/transport-logistique/securite-routiere-en-2021-baisse-record-de-la-mortalite-sur-autoroutes-mais-2022-debuta-dramatiquement-927110.html>

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