Increasing Inflation on Auto Liability Insurance – Impact as of Year-end 2023

By Jim Lynch, FCAS, MAAA,
Dave Moore, FCAS, MAAA,
William Nibbelin, and
Dale Porfilio, FCAS, MAAA

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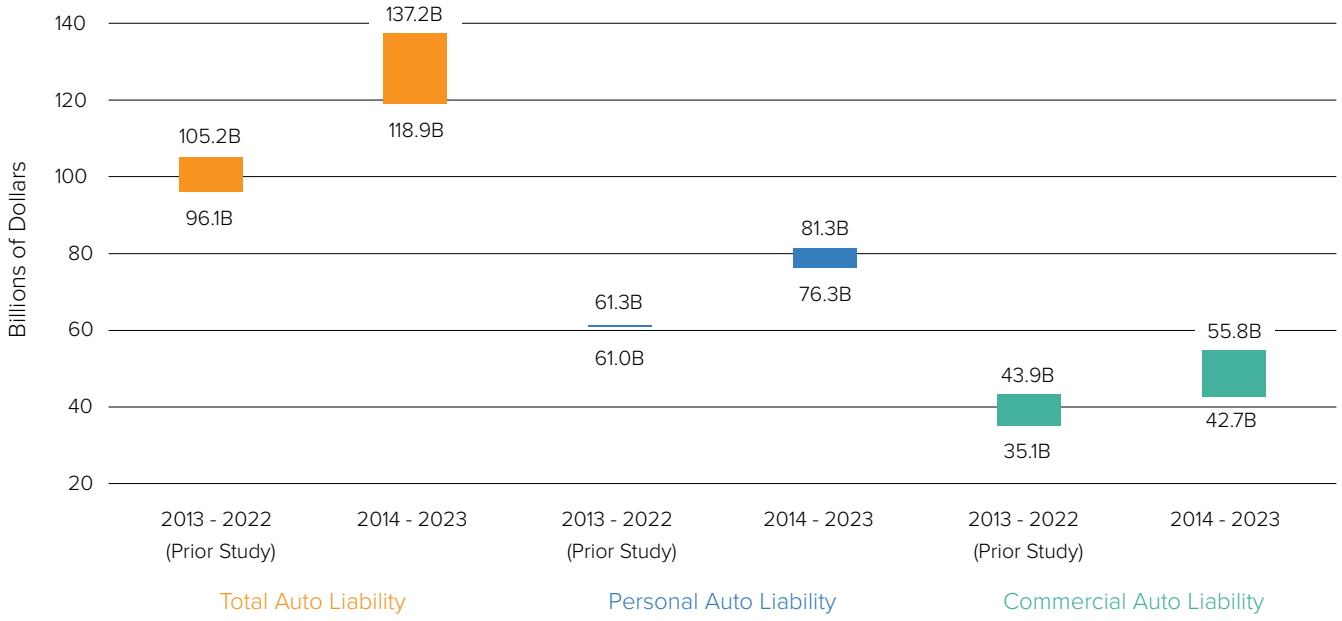
Executive Summary

This paper discusses the combined impact of social and economic inflation because the study's actuarial methodology cannot differentiate between underlying drivers. Social inflation is defined as "excessive inflation in claims" for the purposes of this paper and is a term primarily used by insurance industry professionals. It is closely related to "legal system abuse," which the Insurance Information Institute (Triple-I) defines as policyholder or plaintiff attorney practices that increase the costs and time required to settle insurance claims to the detriment of consumers. This paper will use social inflation because its definition better aligns with this study's actuarial methodology.

Increasing economic and social inflation continues to profoundly influence escalating insurance costs. Between 2014 and 2023, increasing inflation drove auto liability losses and defense and cost containment (DCC) expenses up by a range of $118.9 billion to $137.2 billion, or 9.9% to 11.5% of the $1.2 trillion in net losses and DCC for the period. This represents a 24% to 31% increase from the authors' previous analysis of 2013-2022, which estimated an impact range of $96 billion to $105 billion. Figure 1 illustrates the comparison of these ranges with the prior study.

Figure 1: Increasing Inflation Ranges



- For commercial auto liability, the increase in losses and DCC was a range of $42.7 billion to $55.8 billion, or 20.7% to 27.0% of the total, higher than the previous study's range of $35 billion to $44 billion. This rise is due to adverse development and dropping off accident year 2013 while adding accident year 2023 to the analysis. Claim frequency remains below pre-pandemic levels. Severity rose 78% from 2014 to 2023, compared to a 29% rise in the Consumer Price Index (CPI).
- Personal auto liability also experienced significant impacts, with increasing inflation driving losses and DCC up by a range of $76.3 billion to $81.3 billion, representing 7.7% to 8.2% of the total, an increase from the previous $61 billion estimate for 2013-2022. This rise is attributed to adverse development and dropping off accident year 2013 while adding accident year 2023 to the analysis. Claim frequency remains below pre-pandemic levels. Severity continues to rise – 73% from 2014 to 2023, for a compound annual growth rate from 2014 to 2023 of 6.3%. The compounded growth rate for severity nearly tripled after 2019, from 3.6% between 2014 and 2019 to 9.8% from 2020 to 2023.

Prior research

In a series of studies, Lynch, Moore and Porfilio have examined the impact of increasing inflation on LDFs. These analyses used industrywide claims data and actuarial metrics to present their findings on the pervasive impact of inflation across various lines of insurance. In 2022 their study estimated that inflationary factors consistent with social inflation increased commercial auto liability losses by $20 billion between 2010 and 2019, 14% of loss and DCC expenses in the period.[1] A follow-up study as of year-end 2021 revealed a pandemic-driven slowdown in tort dispositions and case backlogs, yet finding that factors consistent with social inflation added more than $30 billion to claims from 2012 to 2021, about 20 percent of loss and DCC.[2] In the next study as of year-end 2022, Lynch, Moore, and Porfilio explored the combined effects of social and economic inflation on personal and commercial auto liability insurance, finding that these trends increased costs by $96 billion to $105 billion between 2013 and 2022 - $61 billion for personal auto (6.5% of that line's total loss and DCC) and $35 billion to $44 billion in commercial auto (19% to 24 percent of total loss and DCC). This study also highlights significant changes in claim patterns due to the pandemic.[3] Finally, a 2023 report by Lynch and Moore, published by The Doctors Company, estimates that social inflation contributed $2.4 billion to $3.5 billion to medical malpractice claims (8% to 11% of total loss and DCC) for the decade ending in 2021. The report also used a publicly available database to identify a significant rise in large settlements.[4]

More recently, RAND Corporation examined trends through 2019 in litigation rates, trial awards, and insurance claim payments that are consistent with the expected effects of social inflation. Their research found trends in trial awards and insurance claim severity that would be suggestive of social inflation. Court filings per capita in state courts were rising, as were plaintiff win rates and trial awards. Inflation-adjusted severity of bodily injury insurance claims rose faster beginning in 2014. The study stopped short of calling its evidence conclusive of social inflation, suggesting there could be factors external to the civil justice system explaining the phenomena.[5]

Methodology Overview

As in the most recent paper, we focus on personal auto liability and commercial auto liability. This analysis is similar to preceding papers. It takes advantage of the processes by which a property/casualty insurance company estimates how much it will ultimately pay on the claims it incurs.

We monitor industrywide change in premiums and losses by line of business, standardized by nominal Gross Domestic Product (GDP), which has no inflation adjustment. This shows the general state of the market – whether rates are rising or falling and whether losses are growing faster than exposures and inflation.

We monitor two standard actuarial metrics: frequency, the number of reported claims per unit of exposure (here nominal GDP); and severity, the size of the average reported claim. An increase in frequency would suggest that higher accident rates are making losses greater than they would otherwise be. An increase in severity would suggest that inflationary pressures are at work.

Next, we examine loss development factors (LDFs), which show how loss estimates for claims incurred in a year grow over time.[6]

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1. Jim Lynch and Dave Moore, "Social Inflation and Loss Development," Casualty Actuarial Society and Insurance Information Institute, 2022.

2. Jim Lynch and Dave Moore, "Social Inflation and Loss Development – An Update," Casualty Actuarial Society and Insurance Information Institute, 2023.

3. Jim Lynch, Dave Moore, and Dale Porfilio, "Impact of Increasing Inflation on Personal and Commercial Auto Liability Insurance," Insurance Information Institute, 2023.

4. Jim Lynch and Dave Moore, "Medical Malpractice Claims-Made Social Inflation and Loss Development Report," The Doctors Company, 2023.

5. Lloyd Dixon, Nicholas M. Pace, James Davidson, and Jamie Morikawa, "What Is the Evidence for Social Inflation? Trends in Trial Awards and Insurance Claim Payments," RAND Corporation, 2024.

6. Complex insurance claims can take years to settle. Companies estimate how much has been paid on each claim and how much more will be needed to settle it. In the aggregate these case estimates are frequently too low. Actuaries study the adequacy of case reserves to estimate additional bulk reserves They do this by grouping claims into cohorts. One common cohort is the Accident Year (AY) – the year in which the claims were incurred. They monitor the growth across time using a metric known as a loss development factor (LDF). It is the ratio of loss estimates over time – 12 months after the start of an accident year, 24 months, etc. LDFs are also known as link ratios, and the terms are used interchangeably in this paper.

LDFs are also known as link ratios. We are examining whether link ratios for a given calendar year are consistently higher than their predecessors, a sign of increasing inflation.

To make trends easier to discern, we multiply the 12-24, 24-36, 36-48 and 48-60 link ratios of each calendar year to create a calendar year 12-60 development factor, abbreviated as CYR 12-60 LDF. If CYR 12-60 LDFs are increasing across time, it is a sign of increasing inflation.

We perform an actual vs. expected analysis for the most recent 10 years of data. If actual losses consistently exceed what was expected, it can be a sign of increasing inflation.

We examine changes in booked ultimate losses. If the booked ultimate losses consistently increase, it can be a sign of increasing inflation.

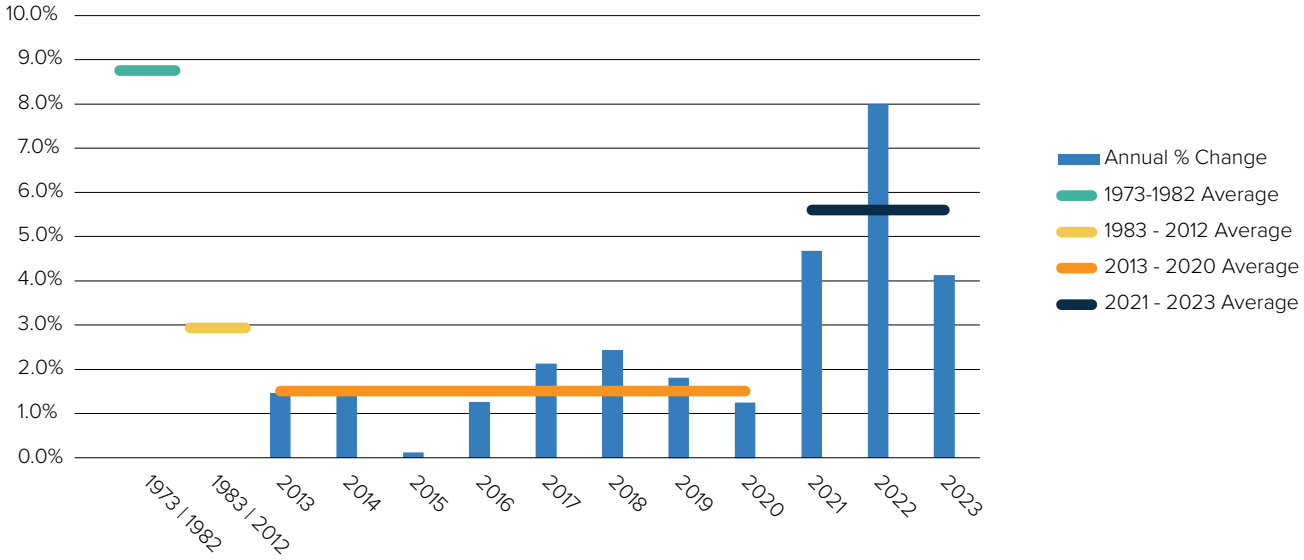
We compare the actual booked ultimate losses with what actuarial methods would have projected had loss development factors not changed – in essence, removing the impact of increasing inflation. This provides us with an estimate of the impact of increasing inflation.

The differences from prior studies amount to a roll-forward of prior work. The twenty-year analysis period was updated from 2003-2022 to 2004-2023 and the ten-year period from 2013-2022 to 2014-2023. The base development year of 2008 remained unchanged, along with the critical inflection points of 2019, representing the year before the onset of the COVID-19 pandemic, and 2020, the year the pandemic began.

Overall economic inflation trends

This section summarizes nationwide economic trends that help deliver insight into the analysis. The COVID pandemic began to significantly affect the economy and driving patterns in March 2020, with the onset of significant lockdowns of government offices, businesses and schools.

Figure 2: Annual Change in CPI-All Urban - Annual Average



Source: Consumer Price Index for All Urban Consumers: All Items in U.S. City Average, Index 1982-1984=100, Monthly, Seasonally Adjusted accessed July 17, 2024, from FRED (Federal Reserve Economic Data): https://fred.stlouisfed.org/

Economic inflation accelerated in 2021, driven, in part, by severe disruptions in the supply chain and a sharp increase in government spending that was a response to pandemic conditions.[7] Figure 2 shows annual changes in the Consumer Price Index-All Urban Consumers (CPI-All Urban). The bars show the annual change by year beginning with 2013. The horizontal lines show the average annual increase across various time periods. The index rose 4.1% in 2023, comparable to 2021 (4.7%) but nearly half the 2022 increase (8.0%).

- Looking at the past 50 years: From 1973 to 1982 the index rose an average of 8.8% per year. In the following three decades (1983 to 2012) the index rose more slowly, to just under 3% per year. From 2013 to 2020, the increase was even slower, 1.5%. The index spiked the latest three years, averaging 5.6% a year for 2021 to 2023. The 2022 increase, 8.0%, was the highest increase in the annual average since 1981 (10.4%).
- The CPI-All Urban has continued to increase faster than the 1983-2012 and 2012-2020 eras (4.1% in 2023). Before 2021, it had been more than 30 years since the index had risen so much (4.1% in 1991).

Commercial Auto Liability Trends

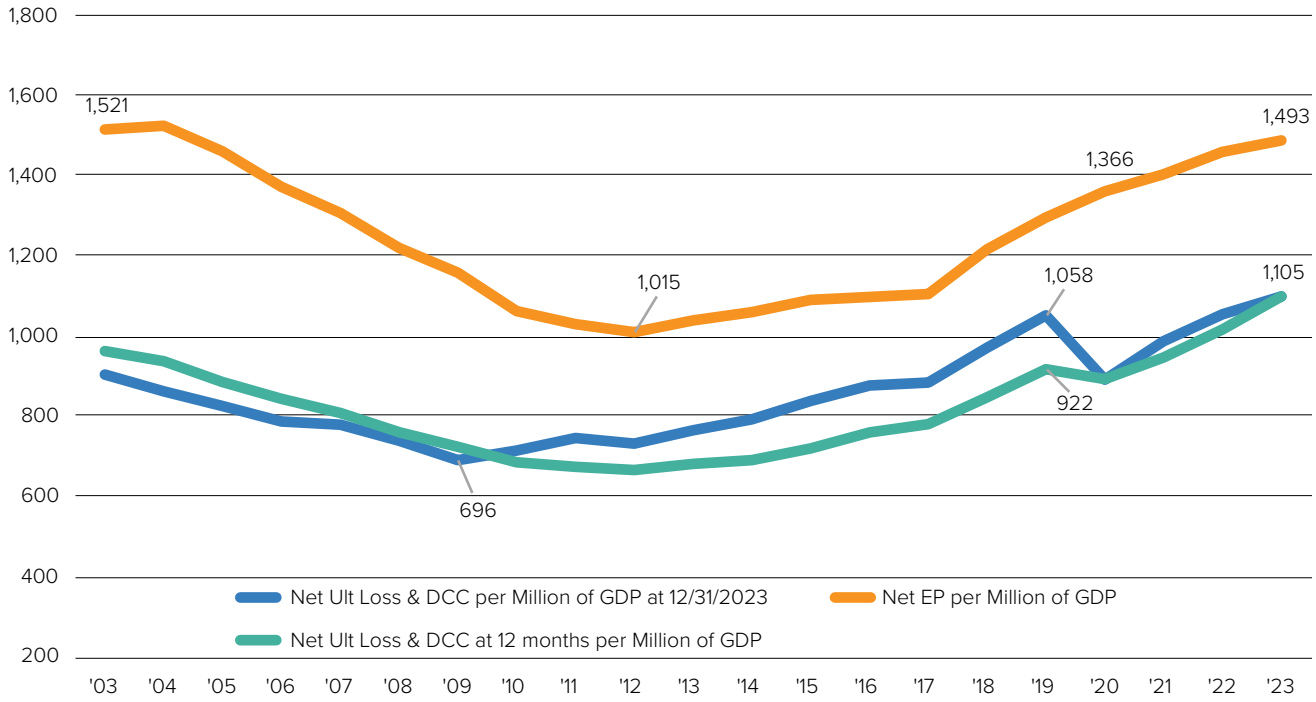
This section examines Annual Statement data to find trends over time in commercial auto liability premiums, losses and loss development. From this we draw conclusions about the inflationary environment insurers face and how it differs from the overall inflationary environment.

Premium and Losses

Figure 3 shows net earned premiums and net ultimate losses (including DCC) by accident year for commercial auto liability insurance per millions of dollars in GDP.

Figure 3: Commercial Auto Liability

Net Earned Premium (EP) and Ultimate Loss & DCC per Million of GDP by Accident Year – P&C Industry



Source: NAIC P&C Industry Commercial Auto Schedule P data accessed July 12, 2024, sourced from S&P Global Market Intelligence. Nominal Gross Domestic Product, Annual, Not Seasonally Adjusted accessed July 17, 2024, from FRED (Federal Reserve Economic Data): https://fred.stlouisfed.org/

7. Greg Ip, "Why Inflation Erupted: Two Top Economists Have the Answer," Wall Street Journal, May 23, 2023, accessed July 30, 2024.

The orange line represents premiums per million GDP. In 2023 Net Earned Premium per $1M GDP increased for the 11th consecutive year, a clear sign that rates continue to rise. It was 47 percent higher than in 2012 and the highest since 2004.

The other lines show two evaluations of losses. The green line represents the first evaluation of losses for each accident year. The blue line represents the most recent evaluation, 12/31/2023.[8] For example, the 2019 estimate on the green line (922) is from evaluations made at the end of 2019. The 2019 estimate on the blue line (1,058) is from evaluations made at the end of 2023. Note that the more recent estimate is considerably higher than the first estimate. This indicates that results for that accident year have been worse than first expected.

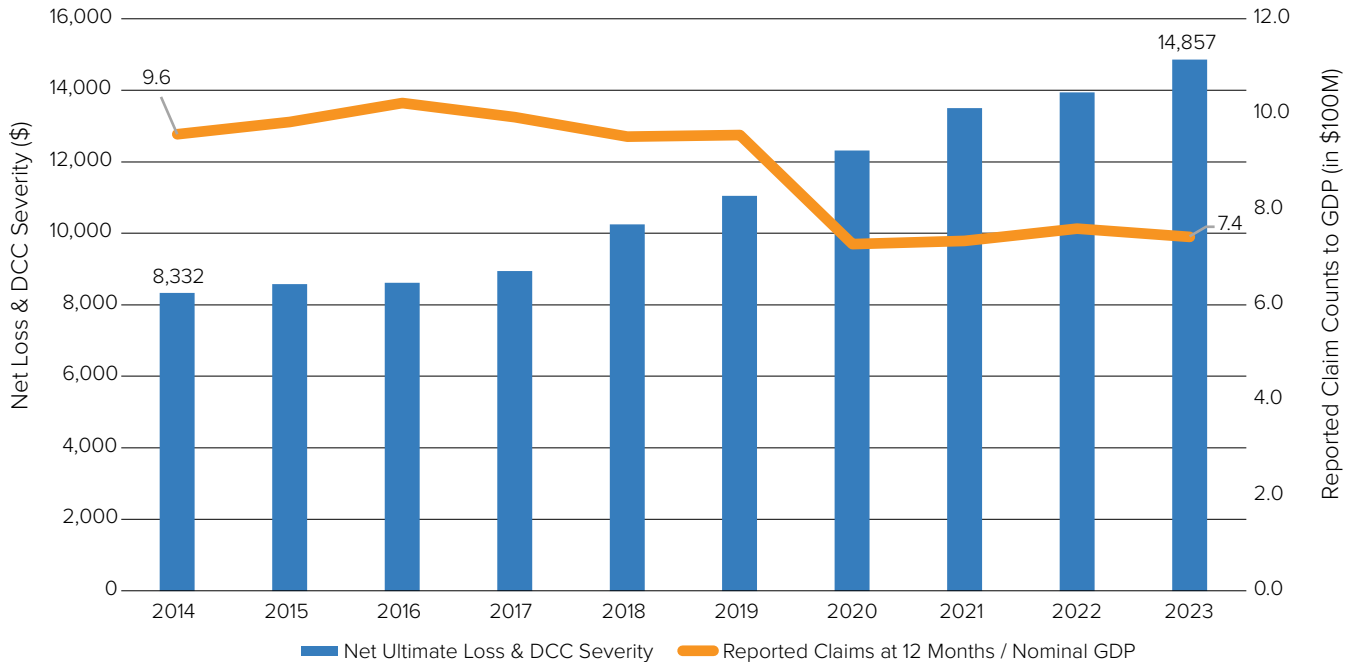
Both lines on the chart show losses have resumed increasing following the sharp decline in 2020, the first year of the pandemic. Losses to GDP in 2023 were 48 percent higher than in 2008 and were the highest in the study.

Frequency and Severity

Figure 4 shows the frequency of reported claims per $100 million of GDP and the severity of the average reported claim for commercial auto liability insurance.

Figure 4: Commercial Auto Liability

Reported Claim Frequency and Net Ultimate Loss & DCC Severity by Accident Year – P&C Industry



Source: NAIC P&C Industry Commercial Auto Schedule P data accessed July 12, 2024, sourced from S&P Global Market Intelligence. Nominal Gross Domestic Product, Annual, Not Seasonally Adjusted accessed July 17, 2024, from FRED (Federal Reserve Economic Data): https://fred.stlouisfed.org/

Claim frequency fell sharply in 2020, at the outset of the pandemic. It remained lower through 2023 at 7.4 claims per $100 million GDP – similar to years 2020 to 2022. In the six years preceding the pandemic, claim frequency averaged 9.8 reported claims per $100 million GDP. Some of the decrease can be attributed to changes in behavior. People are driving less, and other factors may be at work, such as safer vehicles or in-vehicle monitoring technology.

8. Annual Statement data contain Accident Year re-evaluations across a decade. For this study, the most recent evaluations of Accident Years 2014 to 2023 occurred as of 12/31/2023. For earlier years, we use the most recent evaluation available. For 2013, that would be as of 12/31/2022; for 2012, that would be as of 12/31/2021, and so on.

Claim severity rose 78 percent from 2014 to 2023, a compound annual growth rate of 6.6 percent. By comparison, the CPI-All Urban rose less than half as fast in that time, 29 percent, a compound annual inflation rate of 2.8 percent.

The decrease in frequency shows that the accident rate is not contributing to the increase in commercial auto liability losses. If anything, it is a mitigating factor. The fact that claim severity is rising faster than economic inflation indicates that insurers have faced inflationary factors that far outstrip general inflation trends.

Loss Development

This section looks for trends in inflation by examining triangles of LDFs. When inflation is stable, LDFs also tend to be stable. Rising LDFs can be a sign that insurers face increasing inflation.

Figure 5 shows net paid loss and DCC LDFs for 2003 and all subsequent accident years. The chart is color-coded. An LDF is shaded red if it is higher than the factor immediately above. The shading shows a consistent upward trend in LDFs throughout the loss triangle, evidence of increasing inflation. The last two diagonals are all red with one exception, the final 24:36 month LDF. Even that is the second highest observation in that column. Case-incurred LDFs display a similar pattern.

The column at far right shows the calendar year 12-60 development factors as described in the Methodology section. Those factors are redisplayed in Figure 6 for visual emphasis.

Figure 5: Commercial Auto Liability

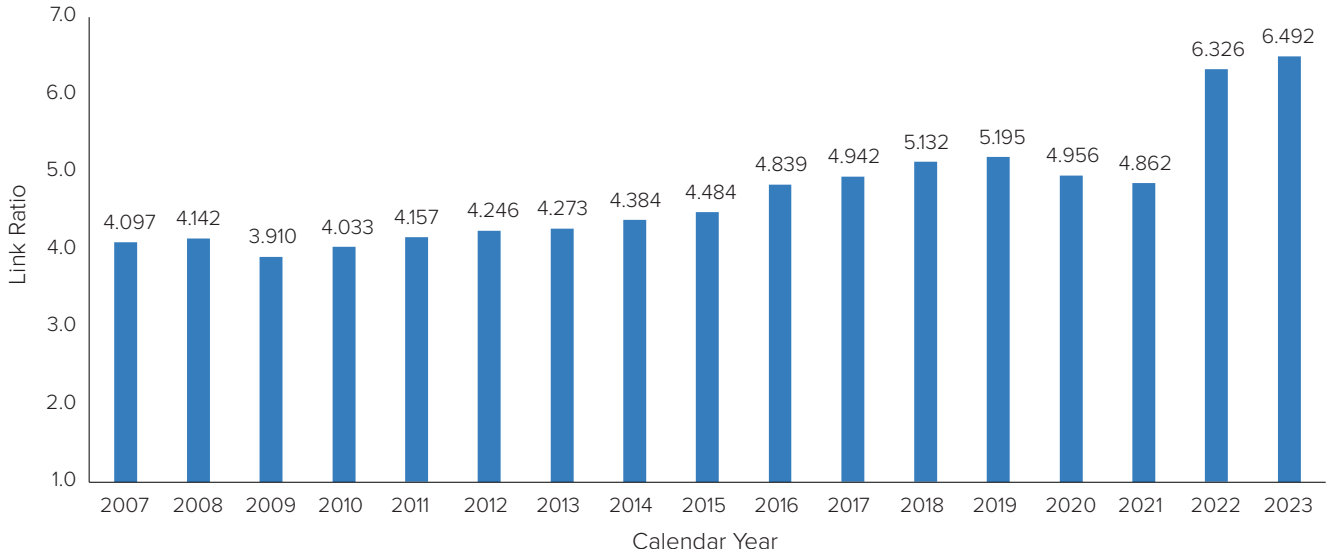
Net Paid Loss & DCC Link Ratio – P&C Industry

Acc Year	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	CYR 12-60
2003	2.117	1.454	1.232	1.116	1.050	1.020	1.010	1.005	1.005	
2004	2.041	1.442	1.236	1.115	1.049	1.021	1.010	1.006	1.002	
2005	2.140	1.439	1.226	1.105	1.046	1.019	1.010	1.003	1.004	
2006	2.064	1.444	1.213	1.107	1.043	1.023	1.011	1.005	1.004	
2007	2.099	1.424	1.222	1.106	1.049	1.022	1.007	1.006	1.003	4.097
2008	2.048	1.433	1.228	1.111	1.049	1.022	1.010	1.006	1.002	4.142
2009	2.081	1.440	1.238	1.117	1.053	1.022	1.012	1.006	1.005	3.910
2010	2.125	1.450	1.232	1.120	1.051	1.025	1.011	1.005	1.004	4.033
2011	2.129	1.440	1.242	1.128	1.057	1.023	1.012	1.007	1.002	4.157
2012	2.155	1.454	1.249	1.126	1.051	1.025	1.012	1.004	1.002	4.246
2013	2.168	1.465	1.270	1.132	1.056	1.029	1.008	1.004	1.004	4.273
2014	2.173	1.507	1.269	1.145	1.057	1.019	1.009	1.009	1.005	4.384
2015	2.247	1.504	1.288	1.135	1.048	1.022	1.020	1.010		4.484
2016	2.286	1.517	1.285	1.114	1.053	1.040	1.021			4.839
2017	2.293	1.510	1.238	1.124	1.082	1.043				4.942
2018	2.359	1.493	1.245	1.168	1.083					5.132
2019	2.406	1.479	1.316	1.177						5.195
2020	2.350	1.593	1.320							4.956
2021	2.583	1.586								4.862
2022	2.632									6.326
2023										6.492

Source: NAIC P&C Industry Commercial Auto Schedule P data accessed July 12, 2024, sourced from S&P Global Market Intelligence.

Figure 6: Commercial Auto Liability

Net Paid Loss & DCC CYR 12-60 Loss Development Factors – P&C Industry



Source: NAIC P&C Industry Commercial Auto Schedule P data accessed July 12, 2024, sourced from S&P Global Market Intelligence.

The highest CYR 12-60 LDFs, by far, appear in the two latest years, but there is a consistent upward trend throughout the 2010s. We identify three possible reasons:

- For recent years, excessive economic inflation. Although the change in CPI-All Urban was less in 2023 than a year earlier, it remained higher than the other preceding 30 years.
- Catch-up on case/court backlog from pandemic. Lynch, Moore and Porfilio demonstrated that the creation of a backlog of cases, followed by a speed-up to clear the backlog, could create LDFs similar to those seen here.[9]
- Social inflation. The increase in LDFs during the 2010s occurred when economic inflation was stable and there were no disruptions from the pandemic or other outside forces. We are unaware of evidence that the underlying drivers of social inflation have ebbed.

Figure 7 shows the results of an actual vs. expected analysis. Actuaries use LDFs to forecast the timing of loss emergence. If actual loss emergence exceeds the forecast, it is evidence that the ultimate projected loss is inadequate.

9. Lynch, Moore, and Porfilio, 2023, p. 26.

Figure 7: Commercial Auto Liability

Actual vs Expected Net Loss & DCC Link Ratio – P&C Industry ($ millions)

	Paid Emergence on Prior Accident Years through 120 Months				Case-Incurred Emergence on Prior Accident Years through 120 Months			
Calendar Year	Expected	Actual	Variance	% Variance	Expected	Actual	Variance	% Variance
2014	8,813	9,116	303	3.4%	5,107	5,638	531	10.4%
2015	9,326	9,707	381	4.1%	5,712	6,121	409	7.2%
2016	9,920	10,857	938	9.5%	6,253	6,934	681	10.9%
2017	10,976	11,605	629	5.7%	7,121	7,536	416	5.8%
2018	12,070	12,900	829	6.9%	7,827	8,274	447	5.7%
2019	13,540	14,025	484	3.6%	8,788	9,357	569	6.5%
2020	14,866	14,008	-857	-5.8%	9,955	9,805	-150	-1.5%
2021	14,543	13,828	-715	-4.9%	9,802	9,441	-361	-3.7%
2022	14,413	18,132	3,718	25.8%	10,491	12,130	1,639	15.6%
2023	17,345	20,768	3,423	19.7%	12,390	14,124	1,734	14.0%
2014 to 2018	51,105	54,184	3,080	6.0%	32,019	34,503	2,484	7.8%
2014 to 2023	125,812	134,945	9,133	7.3%	83,445	89,361	5,916	7.1%
2019 to 2023	74,707	80,760	6,053	8.1%	51,425	54,858	3,432	6.7%

Source: Analysis by Insurance Information Institute

Actual emergence exceeded expected significantly in both 2022 and 2023, by far the worst two years since 2014. Paid losses were 25.8% higher than expected in 2022 and 19.7% higher than expected in 2023. Incurred losses were 15.6% higher than expected in 2022 and 14.0% higher than expected in 2023. The deterioration is evidence that increasing inflation continues to significantly affect commercial auto liability business.

Figure 8: Commercial Auto Liability

Estimated Impact of Increasing Inflation ($ millions)

	A	B	C	D = A*(Alternative LDF)	E = B*(Alternative LDF)	F = D - C	G = E - C
	Per 12/31/YYYY Schedule P		Per 12/31/2023 Schedule P	Implied Net Ultimate Loss & DCC using Alternative LDFs		Variance to Booked	
Year	Net Paid Loss & DCC @ 12 months	Net Case Incurred Loss & DCC @ 12 months	Net Ultimate Loss & DCC	3yr Weighted Average as of 12/31/2008 (Paid)	3yr Weighted Average as of 12/31/2008 (Case-Incurred)	3yr Weighted Average as of 12/31/2008 (Paid)	3yr Weighted Average as of 12/31/2008 (Case-Incurred)
2014	2,651	6,940	14,052	12,103	11,662	-1,949	-2,389
2015	2,786	7,495	15,439	12,716	12,596	-2,723	-2,843
2016	2,911	8,071	16,591	13,288	13,563	-3,304	-3,028
2017	3,070	8,454	17,444	14,013	14,208	-3,431	-3,236
2018	3,372	9,394	20,187	15,392	15,788	-4,795	-4,400
2019	3,553	10,371	22,760	16,219	17,430	-6,540	-5,330
2020	2,896	8,769	19,130	13,220	14,737	-5,910	-4,393
2021	3,369	10,964	23,415	15,377	18,427	-8,038	-4,989
2022	4,027	12,858	27,290	18,385	21,609	-8,905	-5,681
2023	4,378	14,189	30,222	19,984	23,846	-10,238	-6,377
Total	**33,011**	**97,506**	**206,531**	**150,697**	**163,866**	**-55,834**	**-42,665**
					% Variance	-27.0%	-20.7%

Source: Analysis by Insurance Information Institute

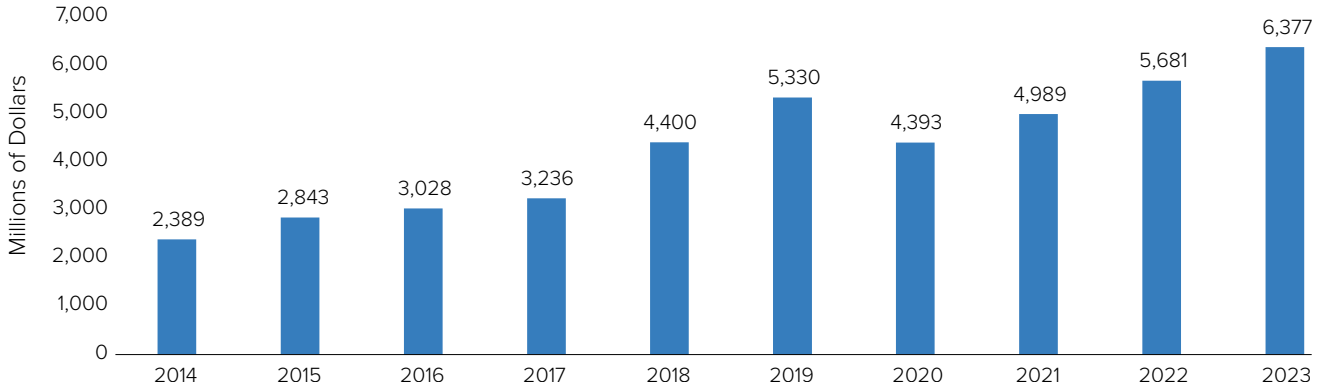
Figure 8 estimates the impact of increasing inflation on commercial auto liability. We reason that increasing inflation began significantly affecting the product line around 2008. We estimate what ultimate losses for the past 10 accident years would have been had LDFs remained at the 2008 level. We compare that to the amount actually booked. The difference is our estimate of the impact of increasing inflation.

Column F indicates that for the 10 years ending in 2023, paid loss development methods would have resulted in estimates of ultimate losses $55.8 billion (27.0%) less than what was booked at the end of 2023 had actual loss emergence been consistent with patterns observed in 2008. Column G is a similar estimate using case-incurred losses. It results in a difference of $42.7 billion (20.7%).

Figure 9 is a visualization of the yearly estimates taken from Column G.

Figure 9: Commercial Auto Liability

Case-Incurred Estimate of Impact of Increasing Inflation by Year – P&C Industry



Source: Analysis by Insurance Information Institute

Note that the estimates for 2014 through 2019 occur in a period of stable economic inflation, as seen in Figure 2 earlier in this paper. This is strong evidence that the inflationary total for those years, $21 billion, is attributable to social inflation. Totals for the subsequent years are a combination of factors, including social inflation, economic inflation and changes in settlement patterns.

Figure 10 estimates the average annual impact of increasing inflation – that is the compounded annual growth rate of inflationary trends from 2014 to 2023.

Figure 10: Commercial Auto Liability

Implied Average Annual Impact of Increasing Inflation ($ millions)

	A	B	C	D = (A/B)^ (1/(Year - 2008)) - 1	E = (A/C)^ (1/(Year - 2008)) - 1
	Per 12/31/2023 Schedule P	Implied Net Ultimate Loss & DCC using Alternative LDFs		Implied Average Annual Impact of Increasing Inflation	
Year	Net Ultimate Loss & DCC	3yr Weighted Average as of 12/31/2008 (Paid)	3yr Weighted Average as of 12/31/2008 (Case-Incurred)	3yr Weighted Average as of 12/31/2008 (Paid)	3yr Weighted Average as of 12/31/2008 (Case-Incurred)
2013	14,052	12,103	11,662	2.5%	3.2%
2014	15,439	12,716	12,596	2.8%	2.9%
2015	16,591	13,288	13,563	2.8%	2.6%
2016	17,444	14,013	14,208	2.5%	2.3%
2017	20,187	15,392	15,788	2.7%	2.5%
2018	22,760	16,219	17,430	3.1%	2.5%
2019	19,130	13,220	14,737	3.1%	2.2%
2020	23,415	15,377	18,427	3.3%	1.9%
2021	27,290	18,385	21,609	2.9%	1.7%
2022	30,222	19,984	23,846	2.8%	1.6%
Total	**206,531**	**150,697**	**163,866**	**2.9%**	**2.2%**

Source: Analysis by Insurance Information Institute

This estimate was calculated through 2022 in the prior study.[10] The estimate using paid LDFs is 2.9 percent, slightly higher than the prior study estimate of 2.7 percent. Using case-incurred LDFs annual growth is 2.2 percent which is on par with the prior estimate of 2.3 percent.

10. Lynch, Moore, and Porfilio, 2023, p. 12.

Personal Auto Liability Trends

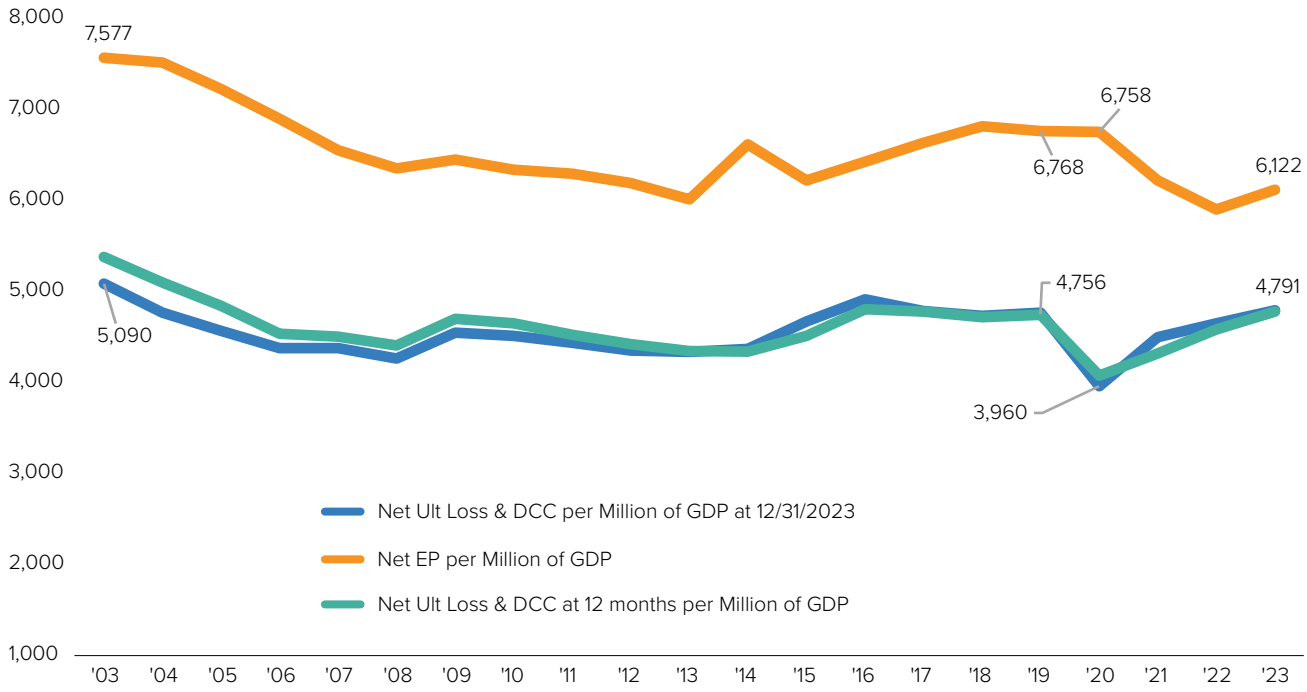
This section examines Annual Statement data to find trends over time in personal auto liability premiums, losses and loss development. From this we draw conclusions about the inflationary environment insurers face and how it differs from the overall inflationary environment.

Premium and Losses

Figure 11 shows net earned premiums and net ultimate losses (including DCC) by accident year for personal auto liability insurance per millions of dollars in GDP.

Figure 11: Personal Auto Liability

Net Earned Premium (EP) and Ultimate Loss & DCC per Million of GDP by Accident Year – P&C Industry



Source: NAIC P&C Industry Personal Auto Schedule P data accessed July 12, 2024, sourced from S&P Global Market Intelligence. Nominal Gross Domestic Product, Annual, Not Seasonally Adjusted accessed July 17, 2024, from FRED (Federal Reserve Economic Data): https://fred.stlouisfed.org/

The orange line represents net earned premium per million of GDP. In contrast to commercial auto, personal auto has experienced an overall flat or declining trend.

The other lines show two evaluations of losses. The green line represents the first evaluation of losses for each accident year. The blue line represents the most recent evaluation, 12/31/2023. The two lines track each other closely, indicating that adjustments to loss estimates for personal auto liability are relatively small. Losses relative to the economy in 2023, $4,791 per million of GDP, were very close to pre-pandemic levels ($4,756 per million in 2019).

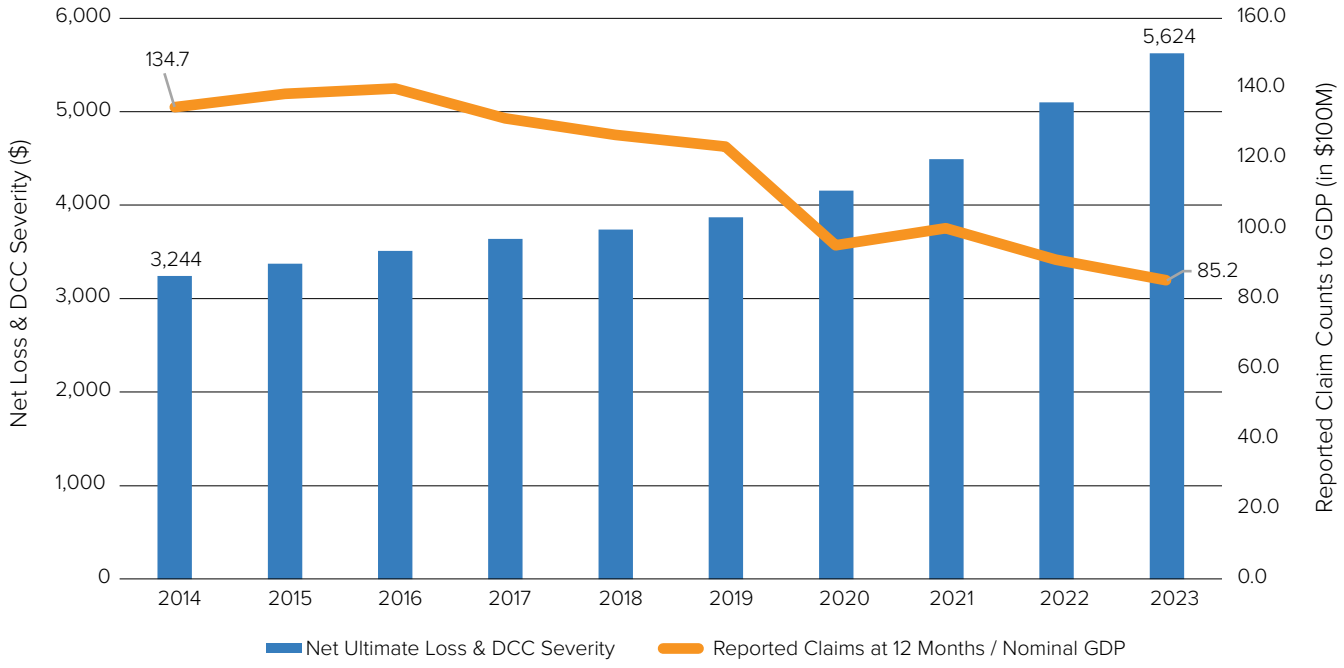
While losses have rebounded, premium has not. In 2023 Net Earned Premium per $1M GDP increased for the first-time post pandemic, by 3.7 percent. It remains 9.5% lower than in 2019.

Frequency and Severity

Figure 12 shows the frequency of reported claims per $100 million of GDP and the severity of the average reported claim for personal auto liability insurance.

Figure 12: Personal Auto Liability

Reported Claim Frequency and Net Ultimate Loss & DCC Severity by Accident Year – P&C Industry



Source: NAIC P&C Industry Personal Auto Schedule P data accessed July 12, 2024, sourced from S&P Global Market Intelligence. Nominal Gross Domestic Product, Annual, Not Seasonally Adjusted accessed July 17, 2024, from FRED (Federal Reserve Economic Data): https://fred.stlouisfed.org/

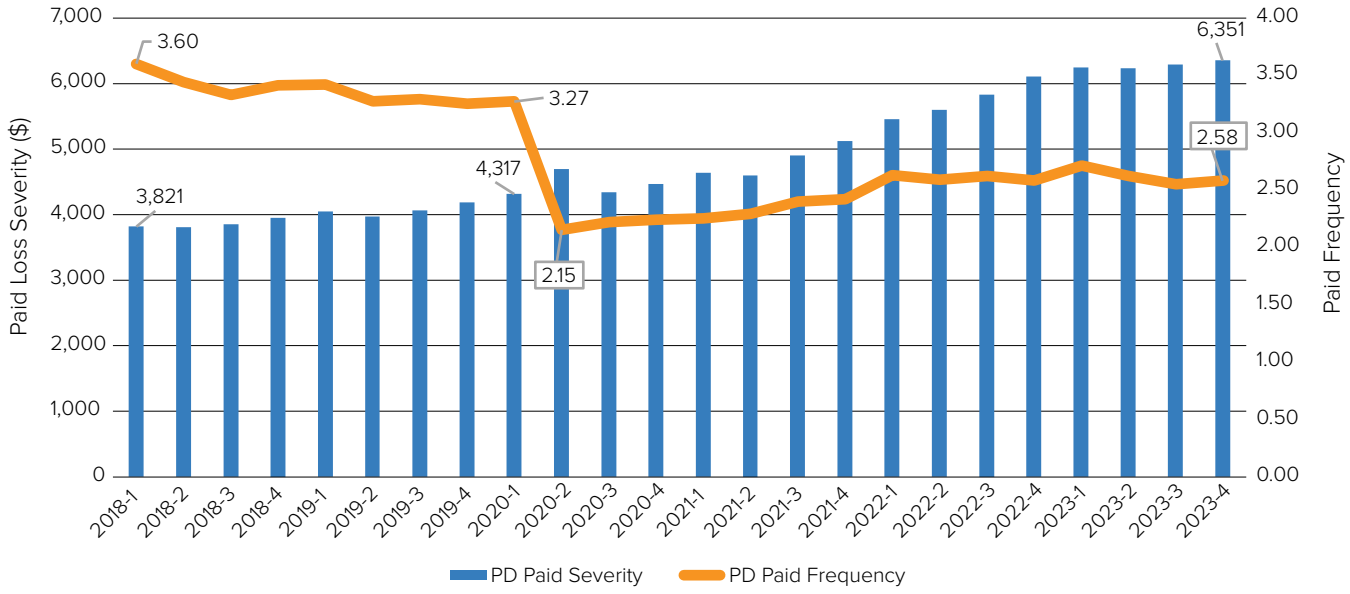
Claim frequency has been declining since 2016, with a sharp drop-off in 2020 and a slight uptick in 2021 – likely driven by pandemic-era driving conditions in both cases. Frequency decreased in 2023 to 85.2 claims per $100M GDP, comparable to years 2020 to 2022 and much lower than the years before the pandemic. From 2014 to 2023, frequency fell 37 percent.

Claim severity rose almost twice as fast, 73 percent over the same period. That is a compound annual growth rate of 6.3 percent. The beginning of the pandemic marks a period of acceleration in claim severity. Severity from 2014 to 2019 grew 3.6 percent annually (compounded) and nearly tripled to 9.8% annually (compounded) from 2019 to 2023.

The data in Figure 12 show the same trends as Fast Track data show for property damage liability and bodily injury liability coverage. Frequency – measured by the number of claims per 100 car-years – falls at the start of the pandemic and remains below pre-pandemic levels. Severity rises, with the increase becoming steeper at the outset of the pandemic. Fast Track data are displayed in Figure 13 and Figure 14.

Figure 13: Personal Auto Liability

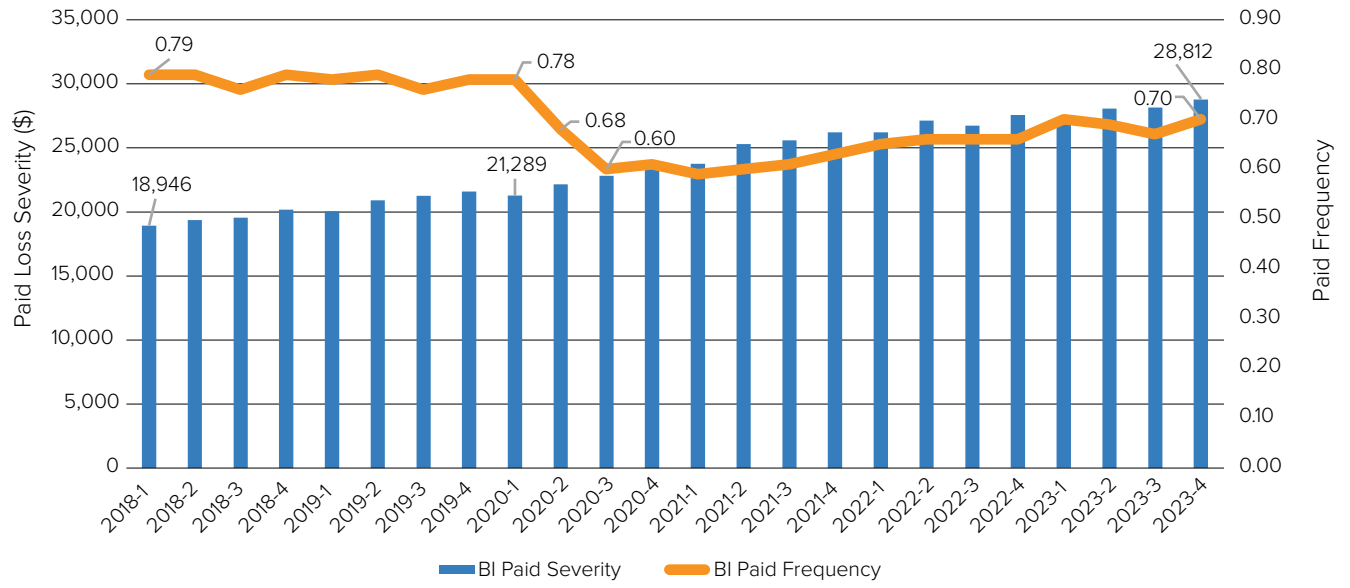
Frequency and Severity, Property Damage (PD) Coverage



Source: Verisk ISO Fast Track frequency and severity quarterly data accessed May 6, 2024

Figure 14: Personal Auto Liability

Frequency and Severity, Bodily Injury (BI) Coverage



Source: Verisk ISO Fast Track frequency and severity quarterly data accessed May 6, 2024

Loss Development

This section looks for trends in inflation by examining triangles of LDFs. When inflation is stable, LDFs also tend to be stable. Rising LDFs are a sign that insurers face increasing inflation.

Figure 15 shows net paid loss and DCC LDFs for 2003 and all subsequent accident years. The chart is color coded. An LDF is shaded red if it is higher than the factor immediately above.

Figure 15: Personal Auto Liability

Net Paid Loss & DCC Link Ratio – P&C Industry

Acc Year	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	CYR 12-60
2003	1.719	1.185	1.092	1.044	1.020	1.008	1.004	1.002	1.002	
2004	1.703	1.187	1.092	1.043	1.017	1.008	1.004	1.002	1.001	
2005	1.701	1.186	1.090	1.041	1.017	1.007	1.004	1.002	1.001	
2006	1.701	1.185	1.085	1.039	1.016	1.007	1.004	1.002	1.001	
2007	1.700	1.175	1.085	1.040	1.016	1.008	1.004	1.002	1.002	2.299
2008	1.694	1.177	1.084	1.042	1.018	1.008	1.005	1.003	1.001	2.291
2009	1.689	1.180	1.088	1.043	1.019	1.009	1.005	1.003	1.002	2.248
2010	1.693	1.183	1.089	1.044	1.020	1.009	1.005	1.002	1.002	2.241
2011	1.690	1.185	1.089	1.045	1.019	1.009	1.004	1.003	1.001	2.252
2012	1.691	1.184	1.091	1.043	1.017	1.008	1.005	1.002	1.001	2.265
2013	1.704	1.187	1.089	1.042	1.017	1.010	1.004	1.002	1.002	2.276
2014	1.715	1.186	1.089	1.043	1.018	1.007	1.004	1.003	1.002	2.296
2015	1.733	1.187	1.090	1.045	1.016	1.009	1.006	1.003		2.320
2016	1.740	1.190	1.094	1.039	1.020	1.012	1.006			2.334
2017	1.749	1.199	1.085	1.045	1.026	1.011				2.342
2018	1.769	1.191	1.091	1.050	1.023					2.367
2019	1.767	1.200	1.099	1.048						2.426
2020	1.826	1.215	1.093							2.372
2021	1.971	1.209								2.499
2022	1.910									2.766
2023										2.645

Source: NAIC P&C Industry Personal Auto Schedule P data accessed July 12, 2024, sourced from S&P Global Market Intelligence.

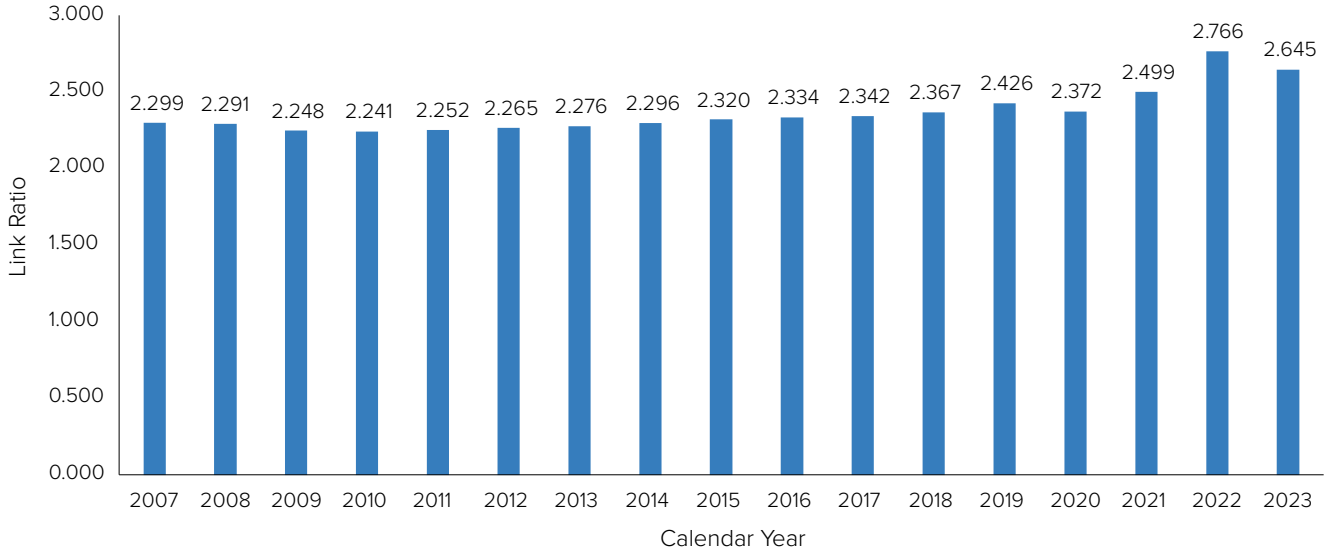
Link ratios during calendar year 2023 (along the last diagonal) are less than their immediate predecessors in every development period. The resulting CYR 12-60 LDF is smaller as well, by -4.4%.

While each link ratio along the latest diagonal decreased, they remain high historically. Each factor along the last diagonal is either the second or third highest for their development period, which can be seen by comparing them with the other values in their respective columns. Case-incurred LDFs display a similar pattern, though to a lesser degree.

Figure 16 is a visualization of the last column of Figure 15, the CYR 12-60 LDFs. It shows both how the latest factor is less than its immediate predecessor yet higher than all other years. As with commercial auto liability, we identify the same possible reasons: excessive economic inflation, a catch-up on a backlog of claims, and social inflation. Regardless, it appears likely that significant inflationary pressures remain present in the line of business.

Figure 16: Personal Auto Liability

Net Paid Loss & DCC CYR 12-60 Loss Development Factors – P&C Industry



Source: NAIC P&C Industry Personal Auto Schedule P data accessed July 12, 2024, sourced from S&P Global Market Intelligence.

Figure 17 shows the results of an actual vs. expected analysis. Actuaries use LDFs to forecast the timing of loss emergence. If actual loss emergence exceeds the forecast, it is evidence that the ultimate projected loss is inadequate.

Figure 17: Personal Auto Liability

Actual vs Expected Net Loss & DCC Link Ratio – P&C Industry ($ millions)

	Paid Emergence on Prior Accident Years through 120 Months				Case-Incurred Emergence on Prior Accident Years through 120 Months			
Calendar Year	Expected	Actual	Variance	% Variance	Expected	Actual	Variance	% Variance
2014	40,050	41,072	1,022	2.6%	15,509	16,359	851	5.5%
2015	42,060	43,401	1,342	3.2%	16,702	18,342	1,640	9.8%
2016	45,676	46,660	985	2.2%	18,803	20,251	1,448	7.7%
2017	49,527	50,083	555	1.1%	20,779	22,590	1,810	8.7%
2018	51,644	52,428	784	1.5%	22,587	23,380	793	3.5%
2019	53,691	56,365	2,674	5.0%	23,828	25,646	1,818	7.6%
2020	56,959	56,134	-825	-1.4%	25,758	25,820	63	0.2%
2021	51,473	54,570	3,097	6.0%	23,386	25,314	1,928	8.2%
2022	55,132	65,783	10,651	19.3%	26,021	31,765	5,745	22.1%
2023	65,944	69,795	3,851	5.8%	31,185	34,651	3,466	11.1%
2014 to 2018	228,957	233,645	4,688	2.0%	94,380	100,922	6,542	6.9%
2014 to 2023	512,156	536,293	24,137	4.7%	224,557	244,119	19,562	8.7%
2019 to 2023	283,198	302,648	19,449	6.9%	130,177	143,197	13,019	10.0%

Source: Analysis by Insurance Information Institute

Issues with higher-than-expected claim emergence began before the pandemic, in 2019. From 2014 to 2018, paid loss & DCC emergence was on average 2.0% more than expected. From 2019 to 2023 this increased to 6.9%. On a case-incurred basis this increased from 6.9% to 10.0% across the same time periods.

While emergence in 2023 was unfavorable, it was considerably less unfavorable than the prior year. For paid losses, emergence was 5.8% above expected in 2023, down from 19.3% a year earlier. For case-incurred losses, the comparable figures were 11.1% in 2023 vs. 22.1% a year earlier. In both instances, the 2023 percentages were considerably higher than the period before 2019. All are signs of inflationary pressures on the line of business.

Figure 18 estimates the impact of increasing inflation on personal auto liability. As with commercial auto liability, we estimate what ultimate losses for the past 10 accident years would have been had LDFs remained at their 2008 level. We compare that to the amount actually booked. The difference is our estimate of the impact of increasing inflation.

Figure 18: Personal Auto Liability

Estimated Impact of Increasing Inflation ($ millions)

	A	B	C	D = A*(Alternative LDF)	E = B*(Alternative LDF)	F = D - C	G = E - C
	Per 12/31/YYYY Schedule P		Per 12/31/2023 Schedule P	Implied Net Ultimate Loss & DCC using Alternative LDFs		Variance to Booked	
Year	Net Paid Loss & DCC @ 12 months	Net Case Incurred Loss & DCC @ 12 months	Net Ultimate Loss & DCC	3yr Weighted Average as of 12/31/2008 (Paid)	3yr Weighted Average as of 12/31/2008 (Case-Incurred)	3yr Weighted Average as of 12/31/2008 (Paid)	3yr Weighted Average as of 12/31/2008 (Case-Incurred)
2014	32,031	57,898	76,944	76,713	75,262	-231	-1,682
2015	35,096	63,522	85,423	84,054	82,573	-1,370	-2,850
2016	37,515	67,657	92,431	89,847	87,948	-2,584	-4,483
2017	37,548	68,157	93,876	89,925	88,599	-3,951	-5,277
2018	38,528	70,132	97,791	92,272	91,166	-5,519	-6,624
2019	40,125	73,620	102,660	96,096	95,700	-6,564	-6,960
2020	31,534	59,418	84,436	75,523	77,239	-8,913	-7,197
2021	37,296	72,078	106,146	89,322	93,695	-16,823	-12,451
2022	43,285	81,356	119,660	103,665	105,756	-15,995	-13,904
2023	46,644	89,423	131,087	111,710	116,242	-19,377	-14,844
Total	**379,604**	**703,260**	**990,452**	**909,125**	**914,179**	**-81,326**	**-76,272**
					% Variance	-8.2%	-7.7%

Source: Analysis by Insurance Information Institute

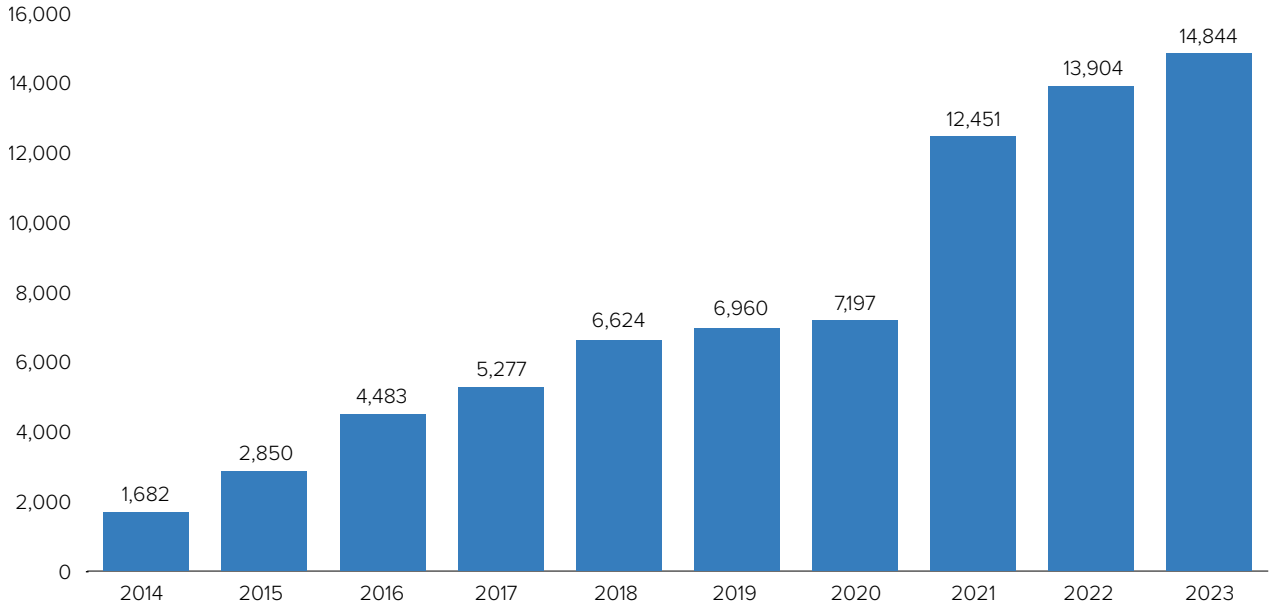
From 2014 to 2023, increasing inflation propelled loss and DCC higher by a range of $76.3 billion to $81.3 billion, or between 7.7% to 8.2% of ultimate loss and DCC. This is larger than the previous study of $61 billion, or approximately 6.6% of loss and DCC, which reviewed 2013 to 2022. The increase is attributed to:

- Net ultimate loss and DCC adverse prior year development of $950 million at year-end 2023 evaluation.
- Dropping Accident Year 2013 and adding Accident Year 2023. The losses for Accident Year 2013 @ 12 months were lower than Accident Year 2023 @ 12 months and closer to the comparison point of 2008, hence less affected by inflationary pressures.

Figure 19 is a visualization of the yearly estimates taken from Column G. The amount rises throughout the decade, with an acceleration of inflationary pressure clearly evident beginning in 2021.

Figure 19: Personal Auto Liability

Case-Incurred Estimate of Impact of Increasing Inflation by Year – P&C Industry



Source: Analysis by Insurance Information Institute

Figure 20 estimates the average annual impact of increasing inflation – that is the compounded annual growth rate of inflationary trends from 2014 to 2023.

Figure 20: Personal Auto Liability

Implied Average Annual Impact of Increasing Inflation ($ millions)

	A	B	C	D = (A/B)^ (1/(Year - 2008)) - 1	E = (A/C)^ (1/(Year - 2008)) - 1
	Per 12/31/2023 Schedule P	Implied Net Ultimate Loss & DCC using Alternative LDFs		Implied Average Annual Impact of Increasing Inflation	
Year	Net Ultimate Loss & DCC	3yr Weighted Average as of 12/31/2008 (Paid)	3yr Weighted Average as of 12/31/2008 (Case-Incurred)	3yr Weighted Average as of 12/31/2008 (Paid)	3yr Weighted Average as of 12/31/2008 (Case-Incurred)
2013	76,944	76,713	75,262	0.1%	0.4%
2014	85,423	84,054	82,573	0.2%	0.5%
2015	92,431	89,847	87,948	0.4%	0.6%
2016	93,876	89,925	88,599	0.5%	0.6%
2017	97,791	92,272	91,166	0.6%	0.7%
2018	102,660	96,096	95,700	0.6%	0.6%
2019	84,436	75,523	77,239	0.9%	0.7%
2020	106,146	89,322	93,695	1.3%	1.0%
2021	119,660	103,665	105,756	1.0%	0.9%
2022	131,087	111,710	116,242	1.1%	0.8%
Total	**990,452**	**909,125**	**914,179**	**0.7%**	**0.7%**

Source: Analysis by Insurance Information Institute

The implied compound annual impact of increasing inflation using both paid LDFs and case-incurred LDFs is 0.7%, slightly higher than the prior estimate (0.6%). More recent years yield higher estimates than older ones.

Conclusion

This analysis underscores the significant impact of economic and social inflation, in combination, on commercial and personal auto liability losses between 2014 and 2023. The sharp rise in average claim size has led to substantial growth in losses, outpacing the Consumer Price Index - All Urban. Insurers have responded to the financial pressures by raising rates. Until the pressure abates, insurers will have to adapt to an increasingly inflationary environment to manage future liabilities effectively.

Further research may be warranted. Additional lines of business, such as general liability and products liability, could be analyzed to better understand how they have weathered inflationary trends. This would require data more granular than that provided in Annual Statements.

In addition, it may be useful to attempt to estimate the impact of individual inflationary elements: economic inflation vs. social inflation vs. other elements. This would provide deeper insights into the multifaceted nature of inflation. This paper discusses the combined impact of social inflation and economic inflation because the study's actuarial methodology cannot differentiate between underlying drivers. The authors explored potential approaches to decompose the overall estimated impact into social inflation vs. economic inflation, but each approach had significant limitations and required additional analysis which was outside the scope of this study.

Appendix I: Data Background

We use Annual Statement data for Commercial Auto Liability and Personal Auto Liability and as of December 31, 2023, specifically from Schedule P, which is submitted to the National Association of Insurance Commissioners. To extend the triangle history from 10 to 20 years, we also used older Schedule P evaluations. Data was obtained from S&P Global Market Intelligence, which compiles individual company submissions and adjusts for intragroup reinsurance cessions.

We employed paid loss and defense and cost containment triangles from Schedule P, Part 3. To develop case-incurred loss triangles, we subtracted Schedule P, Part 4 (incurred but not reported losses and defense and cost containment expenses) from Schedule P, Part 2 (incurred losses and defense and cost containment expenses). We also reviewed claim counts reported in Schedule P, Part 5.

Annual Statement data has specific characteristics that must be considered in any analysis. Losses are net of reinsurance and influenced by the decisions of individual companies. Issues such as homogeneity, credibility, development patterns, reinsurance, and operational changes are significant at the company level but have a reduced impact when analyzing industrywide data. Lynch and Moore have discussed those issues in depth elsewhere.[11]

Claim counts are reported differently by each company, making absolute calculations challenging to interpret. However, we believe the data reveal trends over time. We assume individual company changes have a minimal effect at a national industry level.

As an estimate of exposures, we use data from the Bureau of Labor Statistics on nominal Gross Domestic Product, assuming that property/casualty insurance exposures grow at a similar rate to the economy.

Economic inflation is represented by the Consumer Price Index for All Urban Consumers. (CPI-All Urban) as calculated by the Bureau of Labor Statistics. This study uses the average index for a given year. Previous studies used the year-end index. Because insurers pay their claims throughout the year and not at year-end, we believe the index average better reflects insurance company operations.

We seek patterns in age-to-age loss development trends. Basic actuarial methods, such as the chain-ladder technique, assume predictable movement of losses from unreported to reported. Actuaries assume loss development is a random process with a stable mean. Continually rising link ratios indicate increasing inflation.

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11. Lynch and Moore, 2022, pp. 6-8; Lynch and Moore, 2023, 3.