Impact of Increasing Inflation on Personal and Commercial Auto Liability Insurance

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Executive Summary

Inflationary trends in auto liability insurance, personal and commercial combined, drove loss and defense containment costs (DCC) between $96 billion and $105 billion higher than they would have been for the period from 2013 to 2022.

Throughout this paper, our use of the term "inflation" reflects the combination of both social and economic inflation, unless otherwise specified. Also, loss amounts reflect dollar values as of their respective accident years and have not been adjusted to a common time period.

For personal auto liability insurance, increasing inflation drove loss and DCC higher by $61 billion, or 6.5% of loss and DCC from 2013 to 2022. For the same period, increasing inflation drove commercial auto liability loss and DCC higher by $35 to $44 billion, or between 19% and 24% of loss and DCC.

This study extends previous research that used loss development patterns in industrywide insurance data to look for the presence of inflation in excess of economic inflation, defined as "social inflation." From 2000 through 2020, economic inflation was relatively stable and close to the Federal Reserve's two percent target, so increasing loss development factors could be reasonably attributed to social inflation. Changes in loss development patterns since 2019 can be reasonably attributed to both social inflation and increases in economic inflation, as well as the impact of the pandemic.

The pandemic ushered in significant changes to both commercial and personal auto liability:

- The accident rate – claim frequency – declined in both lines.
- Average claim size – claim severity – rose significantly in both lines.
- Both lines saw a slowdown of claim settlement patterns during the pandemic and a subsequent speed-up, as evidenced by distinct changes in loss development patterns in 2020 and 2021.

This paper examines loss development trends in personal auto liability insurance, as well as updating prior research on commercial auto liability insurance. It extends previous work in attempting to use Annual Statement data through year-end 2022 aggregated from all U.S. insurers to determine the impact of inflation on selected property/casualty insurance lines of business.[1] Prior research used data at earlier evaluation dates to focus on commercial auto liability and medical malpractice. Methodology and data are similar to prior approaches, as discussed in Appendix I.

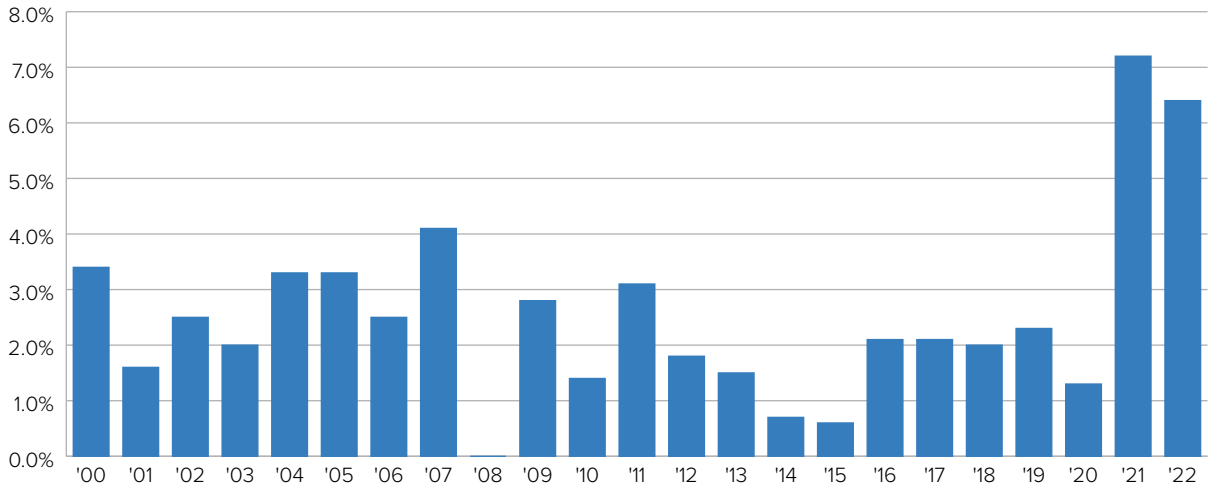
1. Jim Lynch and Dave Moore, "Social Inflation and Loss Development," Casualty Actuarial Society and Insurance Information Institute, 2022; Jim Lynch and Dave Moore, "Social Inflation and Loss Development – An Update," Casualty Actuarial Society and Insurance Information Institute, 2023; Jim Lynch and Dave Moore, "Medical Malpractice Claims-Made Social Inflation and Loss Development Report," The Doctors Company, 2023.

Types of Inflation

Lynch and Moore addressed the myriad definitions of social inflation before settling on this simple one: "excessive inflation in claims."[2] The changing economic environment invites us to refine that definition.

As Chart 1 demonstrates, economic inflation as measured by the Consumer Price Index for all urban consumers (CPI-All Urban) was both low and consistent from 2000 to 2020. It averaged 2.2 percent per year and never rose above 4.1 percent.

Chart 1:
Annual Change in CPI-All Urban



Insurers, meanwhile, were experiencing an increase in their claim costs, particularly among liability claims, that the economic inflation rate did not capture. This was especially true for commercial auto liability insurance, though it seemed to be true elsewhere. To describe it, insurance observers resuscitated the term "social inflation" from the 1970s.

Lynch and Moore's original study focused on insurance trends through the end of 2019. If inflation is stable, they showed, loss development factors (LDFs) at the industry level should be similar from year to year subject to random variation. However, LDFs were steadily rising. Inflationary factors were at work in the insurance industry. Economic inflation couldn't be the cause. It must be social inflation, they concluded.

Circumstances changed in 2021. Chart 1 shows a dramatic increase in the CPI-All Urban. Even without social inflation, one would expect LDFs covering those years to be higher than in preceding years. This paper will demonstrate that LDFs are dramatically higher in 2022. An increase in economic inflation undoubtedly contributed to that.

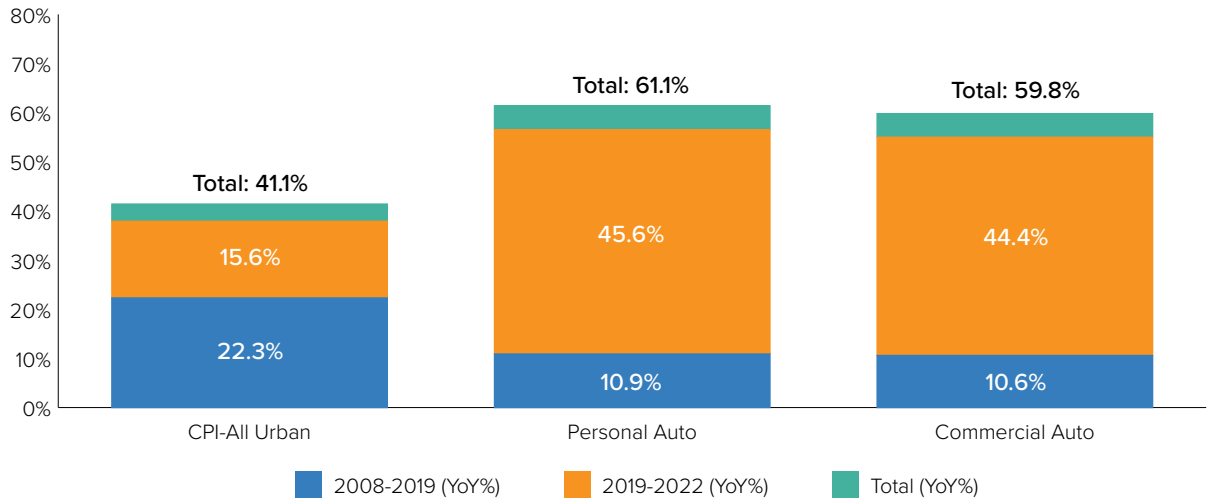
However, it would not be appropriate to conclude that economic inflation alone drove the LDFs higher. Evidence is strong that social inflation was present prior to 2019. It likely persists.

LDFs by themselves do not reveal the source of rising claim costs. This paper will adopt the term "increasing inflation" to address the inflationary phenomena that are driving claim costs higher. Increasing inflation has two parts: economic inflation as shown by the CPI-All Urban; and social inflation, which here will be taken to mean "inflation in claims higher than the economic inflation rate as represented by the CPI-All Urban."

2. Jim Lynch and Dave Moore, 2022, p. 5.

The underlying costs that insurers face are subject to a number of inflationary factors. Some of these underlying costs increased more than economic inflation as measured by the CPI-All Urban. Chart 2 compares annual changes in the CPI-All Urban with the increase in replacement costs that auto insurers face. This replacement cost index reflects a basket of goods and services directly impacting insurance loss costs.

Chart 2:
Increase in CPI-All Urban and Auto Replacement Costs Since 2008



2008-19, 2019-22, 2008-22 (YoY%); Compounded inflation for each period.
Source: Insurance Information Institute.

Since 2008, replacement costs for both commercial and personal auto insurance have risen 40 percent more than prices overall. The timing of that difference is important to note. From 2008 to 2019, overall prices rose more than twice as fast as auto replacement costs. Since then, replacement costs have risen almost three times faster than overall prices. The vast differences from era to era show how different the inflation insurers face can be from what the general public sees. They also show that in recent years, inflation pressures on insurance costs have grown significantly.

Inflationary factors that drive insurance claims can exceed the economic inflation rate, sometimes substantially. Whether one considers that particular source of inflation to be social inflation or economic inflation is an interesting, perhaps important discussion. The tools we use do not distinguish among them.

Regardless of the source, inflated claim costs are the cause of recent increases in auto insurance prices and attract the attention of consumers, regulators, and insurers.

Commercial Auto Liability

This section extends previous analyses of commercial auto liability insurance through year-end 2022 using similar methodology and exhibits. We monitor net earned premium and losses and DCC by accident year, both of which we standardize by nominal GDP. The standardization process gives us insights into trends in rates (increase in standardized premium suggests increasing rates) and loss trends (increase in standardized losses and DCC suggests increasing losses).

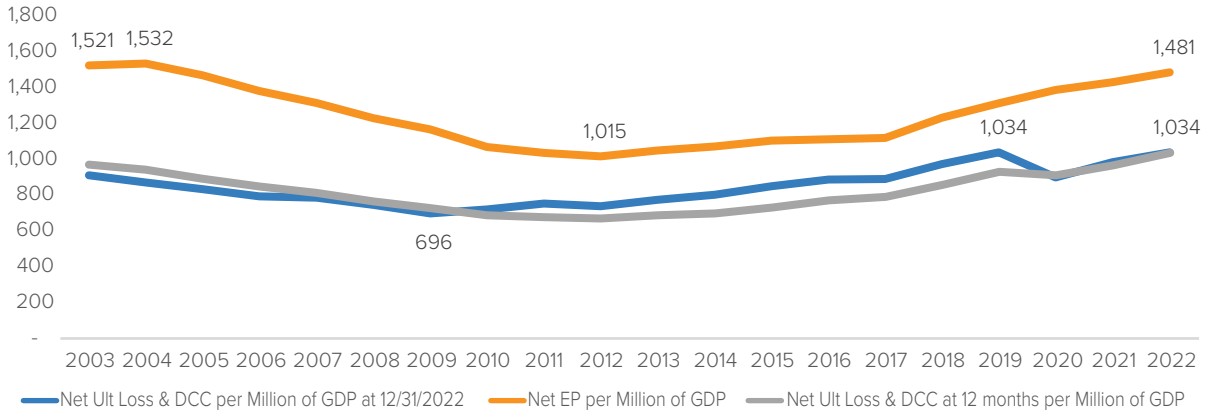
Then we examine trends in loss development factors. We focus on the 12-60 calendar year loss development factor (CYR 12-60 LDF) as described in previous analyses and described in greater detail below. Rising loss development factors suggest increasing inflation.

A more detailed explanation of the methodology and its rationale can be found in our prior work.

Chart 3 shows that standardized premium continues to rise steadily as a percentage of nominal GDP. The 2022 year was the highest since 2004. Premiums as a share of GDP have risen 10 consecutive years and are 46 percent higher than they were a decade earlier.

Chart 3: Commercial Auto Liability

Net Earned Premium (EP) and Ultimate Loss and DCC to GDP (in $ Millions) by Accident Year–P&C Industry



Loss and DCC are 49 percent higher than at their low point in 2009, according to the most recent evaluation of accident years. This means that losses are rising faster than overall inflation and the economy overall. Standardized losses dipped in the first pandemic year (2020) and immediately began rising again in 2021. Accident year 2022 standardized losses are roughly the same as the peak year of 2019. The consistent upward revision of accident year estimates from 2010 and 2019 suggests that estimates of more recent years may soon rise as well.[3]

The pattern we documented in earlier work continues. Rising losses force premiums higher two to three years later. The two- to three-year lag has two primary elements: the time that insurers need to identify their recent loss trends; and the time necessary to implement rate changes, which often require regulatory approval.

3. The industry has experienced 11 consecutive years of unfavorable loss development for commercial auto liability.

Chart 4: Commercial Auto Liability

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

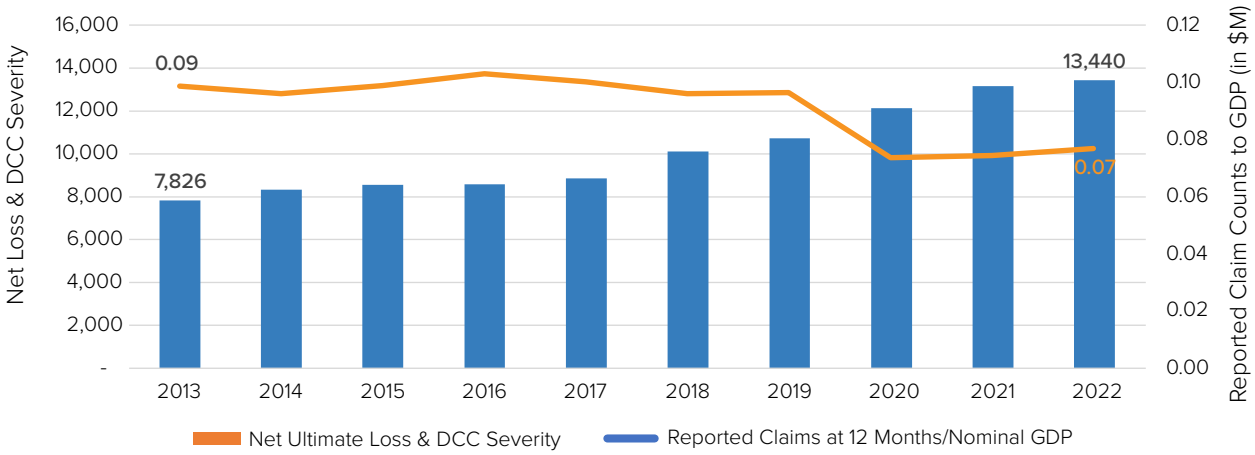


Chart 4 shows 10 years of Annual Statement data on frequency and severity by Accident Year. Frequency is calculated as reported claims at 12 months per $1 million nominal GDP; severity is calculated as net ultimate loss and DCC divided by number of reported claims.[4]

Claim frequency fluctuated from 2013 through 2019 within a narrow range: 9.6 to 10.3 claims per $100 million GDP. It fell 23 percent in 2020, presumably as a result of the pandemic. It has risen slightly through 2022 but remains significantly lower than the pre-pandemic years.

Claim severity has risen 72 percent since 2013, for a compound annual growth rate of 6.2 percent. The median increase was 6.3 percent, with spikes in 2018 (14 percent) and 2020 (13 percent). Four of the last five years exceeded the median increase, a sign the process may be accelerating. It can be noted that the most recent year, 2022, was the single year the increase fell under the median. It should also be noted that the estimates for each year are subject to revision, as insurers re-estimate the ultimate losses for each accident year. This re-estimation typically affects the most recent years the most, and insurers have consistently underestimated losses in this line. For the last seven accident years before the pandemic, re-estimation has increased losses by 13 percent from first report to the 2022 evaluation. Given this record, it is reasonable to assume that 2021 and 2022 accident year losses will develop higher than shown here. Claim severity would follow suit.

By comparison the Consumer Price Index has risen 27 percent since 2013, a compound annual inflation rate of 2.7 percent. The median increase was 2.1 percent. This suggests that the growth in the average auto claim has nearly tripled economic inflation in that period.

4. Claims reported in Annual Statement data are difficult to accumulate across companies due to differences in how individual insurers define claims. This means that absolute calculations might not reflect real world trends. For example, under a uniform definition of claims across all insurers, claim severity in 2022 was almost certainly not $13,440. Year-to-year trends, like percentage change, should be reasonable real-world estimates, assuming that the market share of carriers that change their definition of a reported claim is small over time. All trends discussed in this paper are checked for reasonableness by comparing the industrywide trend with similarly calculated trends at the 10 largest insurers in the line of business being studied. Reported claims at 12 months maturity are used to provide a consistent basis for frequency and severity from year to year. Every year there are claims reported after year-end, but we assume variability in that metric across years is minimal.

Table 1: Commercial Auto Liability

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

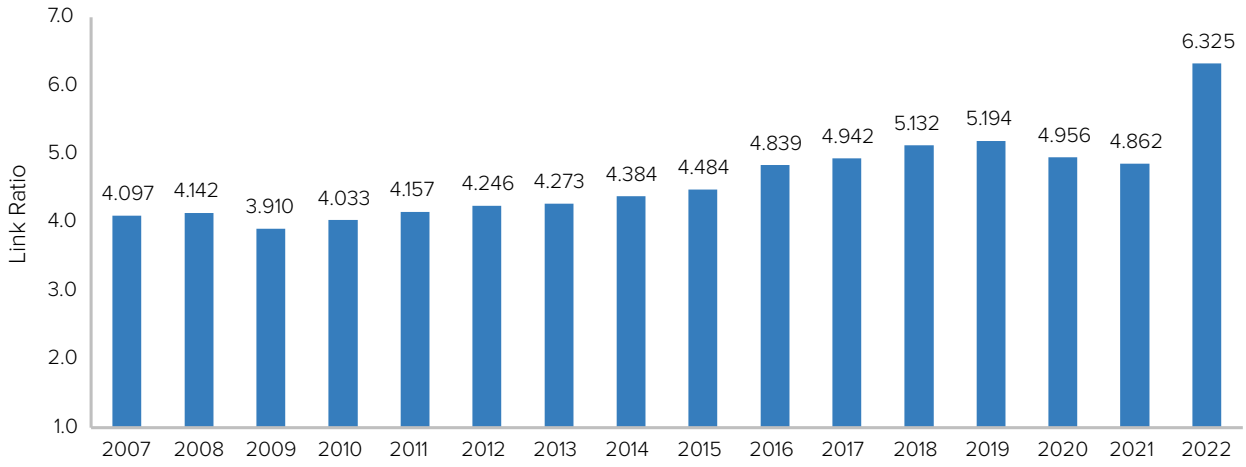
Acc Year	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	CYR 12-60
2003	2.117	1.454	1.232	1.116	1.050	1.020	1.010	1.005	1.005	
2004	2.041	1.442	1.236	1.115	1.049	1.021	1.010	1.006	1.002	
2005	2.140	1.439	1.226	1.105	1.046	1.019	1.010	1.003	1.004	
2006	2.064	1.444	1.213	1.107	1.043	1.023	1.011	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		4.384
2015	2.247	1.504	1.288	1.135	1.048	1.022	1.020			4.484
2016	2.286	1.517	1.285	1.114	1.053	1.040				4.839
2017	2.293	1.510	1.238	1.124	1.082					4.942
2018	2.359	1.493	1.245	1.168						5.132
2019	2.406	1.479	1.315							5.194
2020	2.350	1.593								4.956
2021	2.583									4.862
2022										6.325

Table 1 shows paid loss development factors for Accident Years 2003 through 2022. LDFs are given through 120 months. The final column is the Calendar Year LDF for months 12 through 60 (CYR 12-60 LDF). It is the product of the link ratios from 12 through 60 months for that calendar year. For example, CYR 12-60 LDF for 2022 is 6.325. That number is the product of the first four LDFs along the diagonal of LDFs generated in 2022: 2.583*1.593*1.315*1.168. As in previous work, a cell is shaded if its LDF is higher than the comparable LDF from the preceding Accident Year. (That is to say, it is shaded if its LDF is higher than the LDF immediately above it in the table.)

And as before, there are a lot of shaded areas on this table. In particular, the last diagonal of factors, representing development during calendar year 2022, is larger for every development period. The resulting CYR 12-60 LDF is higher as well, as Chart 5 illustrates.

Chart 5: Commercial Auto Liability

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



Rising LDFs are indicative of increasing social inflation, absent evidence of any other exogenous factors. Since 2019, there may be two other factors at work. Increasing economic inflation, as discussed previously, is one. A slowdown in claims handling brought on by the pandemic may be another.

There is evidence that claims settled more slowly during the pandemic. Courts closed at the outset of the pandemic. Most moved proceedings to a virtual setting. Some courts adjusted to the virtual technology faster than others. The disruption seemed likely to increase the time it would take to process cases, with a slowdown at every step. A June 2021 survey by Thomson Reuters found that the total backlog in cases rose to 1,274 per state or local court, up from 958 in 2019, the last full year before the pandemic.[5]

A 2022 study of federal courts by the Federal Judicial Center, however, found a slowdown in the progress of cases was accompanied by a slowdown in the filing of cases. The number of cases filed fell 6 percent compared to the final two pre-pandemic years, and the number of cases terminated fell by the same percentage. The median time from filing to termination of civil cases grew 7 percent.[6]

The commercial auto liability paid loss triangle exhibits behavior consistent with a one- or two-year slowdown in claims precipitated by a slowdown in the legal system. Factors decline for all development periods except the first in calendar year 2020, and the CYR 12-60 LDF declines. The CYR 12-60 LDF declines in 2021 as well, though the factors applying to older years increase. This suggests the slowdown was in the process of concluding or perhaps did conclude. The increase in the 2022 CYR 12-60 LDF suggests that insurers have largely caught up on backlogs. We explore the impact of a slowdown on loss development factors through a simple model discussed in Appendix II.

Note also that delay in payment in the example doesn't affect the ultimate loss paid or the number of claims reported. Increases in claim severity would not be attributable to a delay in payments alone. Delayed payments could cause an increase in payments if the delay moved the payment into a period where loss costs are higher.

We conclude that there is a strong possibility that recovering from a backlog in claims handling in 2020 and 2021 may have contributed to the increase in CYR 12-60 LDF in 2022. However, it appears clear that inflation is also present.

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5. Gina Jurva, Thomson Reuters Institute, The Impacts of the Covid-19 Pandemic on State and Local Courts Study 2021 (thomsonreuters.com)

6. Roy Germano, Timothy Lau and Kristin Garri, COVID-10 and the U.S. District Courts: An Empirical Investigation, October 2022, https://fingfx.thomsonreuters.com/gfx/legaldocs/gdvzqylknpw/12022022pandemic_study.pdf

The following table and chart, Table 2 and Chart 6, show similar patterns to the paid table and chart above. As above, a cell is shaded if its LDF is higher than the LDF immediately above it in the table.

Table 2: Commercial Auto Liability

Net Case-Incurred 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	1.357	1.144	1.068	1.029	1.010	1.002	1.002	1.001	1.001	
2004	1.303	1.137	1.068	1.023	1.013	1.004	1.002	1.001	1.000	
2005	1.324	1.127	1.065	1.025	1.012	1.003	1.002	0.998	1.000	
2006	1.317	1.127	1.060	1.026	1.007	1.008	1.002	1.000	1.001	
2007	1.344	1.135	1.069	1.023	1.015	1.003	1.002	1.002	1.001	1.631
2008	1.340	1.131	1.064	1.033	1.010	1.007	1.003	1.003	1.001	1.651
2009	1.344	1.136	1.076	1.032	1.016	1.004	1.002	1.003	1.002	1.653
2010	1.360	1.159	1.077	1.040	1.014	1.005	1.003	1.002	1.001	1.667
2011	1.401	1.159	1.081	1.040	1.016	1.007	1.005	1.002	1.001	1.683
2012	1.399	1.165	1.086	1.039	1.015	1.007	1.005	1.001	1.000	1.806
2013	1.411	1.178	1.096	1.042	1.016	1.012	1.002	1.001	1.000	1.801
2014	1.416	1.189	1.105	1.049	1.018	1.007	1.003	1.000		1.847
2015	1.438	1.190	1.104	1.048	1.016	1.009	1.006			1.885
2016	1.426	1.196	1.103	1.041	1.019	1.015				1.948
2017	1.434	1.196	1.091	1.044	1.028					1.954
2018	1.469	1.192	1.097	1.062						1.986
2019	1.466	1.183	1.130							2.029
2020	1.440	1.218								1.983
2021	1.466									1.952
2022										2.144

Chart 6: Commercial Auto Liability

Net Case-Incurred Loss & DCC CYR 12 - 60 Loss Development Factors—P&C Industry

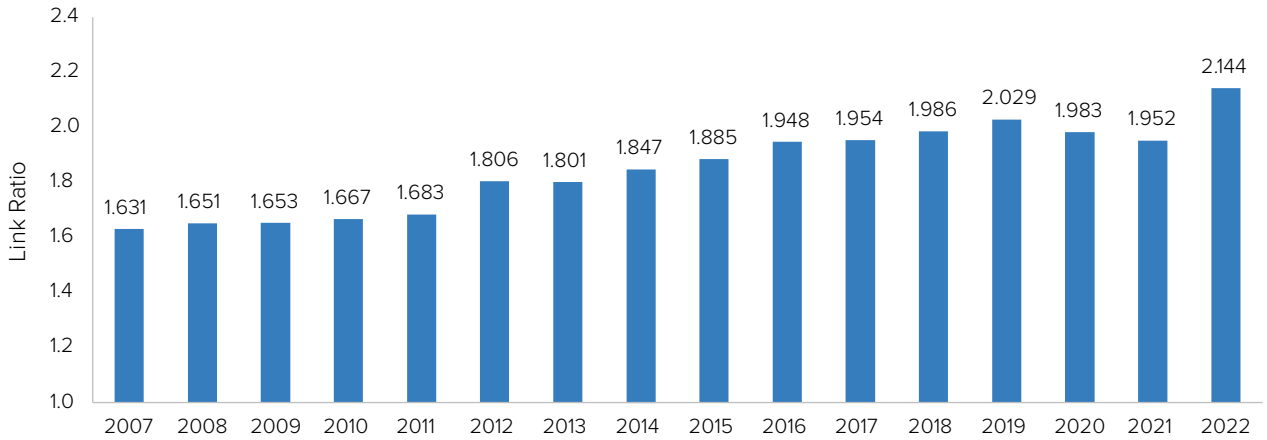


Table 3 shows the results of an analysis of actual loss emergence by calendar year vs. the emergence expected by taking a weighted average of the three previous loss development factors for each accident year analyzed. Emergence was favorable in the pandemic years of 2020 and 2021, when development factors dipped and we observed a slowdown in settlements. Emergence was highly unfavorable ($3.7 billion in paid losses, $1.6 billion in case-incurred losses) in 2022. The 2022 emergence was easily the worst in the past decade.

Table 3: Commercial Auto Liability

Actual vs. Expected Analysis—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
2013	8,433	8,635	202	2.4%	4,699	5,064	365	7.8%
2014	8,813	9,116	303	3.4%	5,107	5,638	531	10.4%
2015	9,326	9,706	381	4.1%	5,712	6,121	409	7.2%
2016	9,918	10,856	938	9.5%	6,253	6,932	680	10.9%
2017	10,975	11,603	628	5.7%	7,120	7,533	413	5.8%
2018	12,069	12,898	829	6.9%	7,825	8,271	446	5.7%
2019	13,539	14,022	482	3.6%	8,785	9,352	567	6.5%
2020	14,864	14,007	(857)	-5.8%	9,952	9,801	(151)	-1.5%
2021	14,543	13,826	(717)	-4.9%	9,799	9,435	(364)	-3.7%
2022	14,412	18,129	3,717	25.8%	10,486	12,123	1,636	15.6%
2013 - 2017	47,464	49,917	2,452	5.2%	28,891	31,289	2,398	8.3%
2013 - 2022	116,891	122,798	5,907	5.1%	75,738	80,271	4,532	6.0%
2018 - 2022	69,427	72,882	3,455	5.0%	46,847	48,982	2,134	4.6%

Table 4: Commercial Auto Liability

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
Year	Per 12/31/YYYY Schedule P		Per 12/31/2022 Schedule P	Implied Net Ultimate Loss & DCC using Alternative LDFs		Variance to Booked	
	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)
2013	2,552	6,604	13,008	11,648	11,099	-1,360	-1,909
2014	2,651	6,940	14,029	12,102	11,663	-1,927	-2,366
2015	2,785	7,495	15,400	12,713	12,596	-2,688	-2,804
2016	2,910	8,071	16,531	13,285	13,564	-3,245	-2,966
2017	3,069	8,456	17,285	14,012	14,211	-3,273	-3,074
2018	3,372	9,396	19,890	15,392	15,791	-4,498	-4,099
2019	3,553	10,375	22,117	16,221	17,436	-5,896	-4,681
2020	2,897	8,774	18,852	13,223	14,745	-5,629	-4,107
2021	3,369	10,970	22,810	15,378	18,435	-7,432	-4,375
2022	4,028	12,866	26,321	18,388	21,623	-7,933	-4,698
Total	**31,185**	**89,947**	**186,242**	**142,361**	**151,163**	**-43,881**	**-35,080**
					% Variance	-23.6%	-18.8%

Table 4 shows the impact of the increase in loss development factors from their trough in 2008. The table compares booked net ultimate loss and DCC (column C) from the most recent Annual Statements to chain-link ratio estimates derived from multiplying losses at 12 months of each accident year by 12-to-ultimate LDFs from the beginning of the period of increasing inflation (2008). Column D shows the results of paid loss development. Column E shows the results of case-incurred loss development. In previous analysis, we attributed this difference to increasing social inflation. We continue to believe that unfavorable variances through the end of calendar year 2019 are largely attributable to social inflation. Unfavorable variances since that period appear to be attributable to both social inflation and increasing economic inflation.

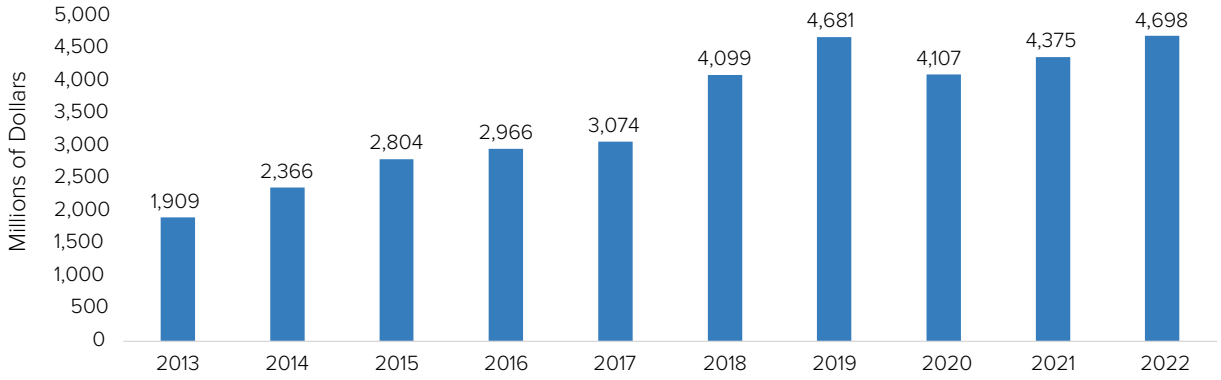
The table indicates that increasing inflation increased losses from 2013 to 2022 in commercial auto liability by between $35 billion and $44 billion, or between 19 percent and 24 percent. This is higher than the range from our 2022 review of losses from 2012 to 2021, $30 billion to $35 billion and 18 to 20 percent. The increase is attributable to:

- Adverse development for the Accident Years 2015 to 2021, reflecting continued inflationary pressures. Ultimate losses for those years rose $2.1 billion at the year-end 2022 evaluation.
- The 10-year lookback period drops Accident Year 2012 and adds 2022. Accident Year 2012 was less affected by inflationary pressures as that year was closer to the comparison point of 2008.

Chart 7 demonstrates visually the rising impact of increasing inflation by showing the impact on losses by Accident Year.

Chart 7: Commercial Auto Liability

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



The impact of increasing inflation has grown steadily, with the exception of the pandemic years. The 2022 impact is estimated at $4.7 billion, which is 18 percent of booked losses. The paid estimate yields a similar result, with increasing inflation growing until the estimate shows a $7.9 billion impact for Accident Year 2022.

Table 5 estimates the annual percentage impact of increasing inflation on the line of business. We calculate the implied compound annual growth rate for each accident year. There are two estimates: one using paid loss development factors and one using case-incurred loss development factors.

Table 5: 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
Year	Per 12/31/2022 Schedule P	Implied Net Ultimate Loss & DCC using Alternative LDFs		Implied Average Annual Impact of Increasing Inflation	
	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	13,008	11,648	11,099	2.2%	3.2%
2014	14,029	12,102	11,663	2.5%	3.1%
2015	15,400	12,713	12,596	2.8%	2.9%
2016	16,531	13,285	13,564	2.8%	2.5%
2017	17,285	14,012	14,211	2.4%	2.2%
2018	19,890	15,392	15,791	2.6%	2.3%
2019	22,117	16,221	17,436	2.9%	2.2%
2020	18,852	13,223	14,745	3.0%	2.1%
2021	22,810	15,378	18,435	3.1%	1.7%
2022	26,321	18,388	21,623	2.6%	1.4%
Total	**186,242**	**142,361**	**151,163**	**2.7%**	**2.3%**

Results across all years are similar and in total are somewhat higher than previous calculations, which implied 2.5 percent annual increase using paid methods and 2.3 percent for case-incurred methods. The estimate for Accident Year 2019 grew considerably, to 2.9 percent using the paid method and 2.2 percent using the case-incurred method, vs. 2.5 percent and 1.8 percent respectively in previous estimates. This is attributable to $853 million in adverse development for Accident Year 2019 during Calendar Year 2022.

It is also worth noting that the trend implied by the case-incurred method is shrinking. This is consistent with claims departments improving their ability to set reserves to anticipate at least some future inflation. This would imply that insurers are adjusting reserving practices in the first 12 months to anticipate increasing inflation.

Conclusions for commercial auto liability:

- Losses continue to grow faster than the overall economy.
- Low, steady economic inflation prior to 2021 implies that increasing social inflation forces were the primary influence for that period.
- The pandemic disrupted the pattern in 2020.
- After that, growing losses may be caused by increasing economic inflation, increasing social inflation or a combination of the two.
- The average size of loss – claim severity – increased dramatically with the pandemic. At the same time the accident rate – frequency – declined. Frequency flattened in 2022, but severity continued its increase. Severity rose more than frequency declined, leading to higher losses overall.
- Loss development factors indicate inflationary factors continue to plague this line of business. Prior to 2020 social inflation was a primary factor. Increasing inflation increased losses from 2013 to 2022 by between $35 billion and $44 billion, or between 19 percent and 24 percent.

Personal Auto Liability

This section applies the above analysis to personal auto liability. Lynch and Moore presented similar data on personal auto liability in previous research but did not comment on the presence or absence of social inflation.[7]

Although they seem similar, commercial auto liability and personal auto liability have important differences that can affect losses and development factors.

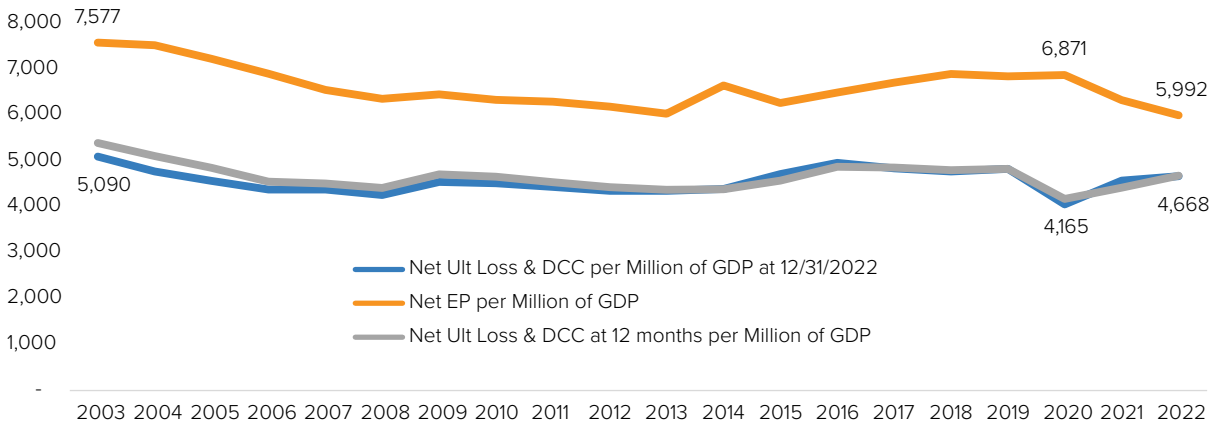
- Vehicles insured by personal auto liability are, on average, smaller. The line doesn't insure dump trucks, delivery trucks or semi-trucks. Elementary physics shows that smaller vehicles cause less damage than larger ones. This would tend to result in lower insured losses in equivalent scenarios.
- Personal auto policyholders buy lower policy limits than commercial auto policyholders. The typical personal auto limit is $60,000 to $100,000. The typical commercial auto limit is $1 million. The lower limit means claims settle faster as there is less money at stake in any dispute. It also means that multimillion dollar settlements are infrequent and have less impact on insured losses or development patterns.
- For many policyholders, personal auto is the sole insurance protection for auto risks. Commercial enterprises often buy excess or umbrella policies that provide protection for claims that settle above the limit of the commercial auto policy. These losses are usually classified as Other Liability losses and do not directly affect losses in the commercial auto liability line. Excess policies put more money at stake in a contentious claim, which gives parties less incentive to settle quickly. This will increase the average size of a commercial auto liability claim and lengthen development patterns, compared with personal auto liability.
- Personal auto policies are purchased by individuals, most of whom have relatively modest means. Many commercial auto policies are purchased by corporations. Some of those corporations are quite large and well-capitalized. If a settlement exceeds all limits available through all policies, the claimant can still recover from the corporation's store of capital. This creates further incentives to lengthen negotiations and maximize commercial auto insurance payouts.

The business of personal auto liability insurance is also many times larger than commercial auto. Personal auto liability had $152.6 billion in net earned premiums in 2022, four times as much as commercial auto liability. It is also subject to more scrutiny from regulators and non-industry elements like the news media and consumer advocates. The size and homogeneity of the line, combined with the scrutiny it receives mean a wealth of complementary information is available. We supplement our analysis with that information where warranted.

Chart 8 shows a long-term downward trend in net earned premium relative to the size of the economy. Standardized personal auto liability premium fell 21 percent from 2003 to 2022. Personal auto insurance premiums are a much smaller share of the general economy than they were two decades ago, implying that personal auto insurance has gotten considerably less expensive relative to other goods and services. By contrast, commercial auto liability has fallen 2.6 percent in that period.

Chart 8: Personal Auto Liability

Net Earned Premium (EP) and Ultimate Loss and DCC to GDP (in $ Millions) by Accident Year—P&C Industry



7. Lynch and Moore, 2022, Appendix D.

Losses and DCC have also fallen relative to the economy, but not as much – 8.3 percent from 2003 to 2022 as of the most recent evaluation.

The long-term decline masks short-term trends. Since Accident Year 2020, standardized premium fell 13 percent, while losses rose 15 percent. A business where losses are climbing while prices are falling is unsustainable. Insurers have been raising rates in response to increasing inflation.[8]

To better understand personal auto liability frequency and severity trends, we supplement Annual Statement data with analyses of data compiled by Fast Track, a service provided through Insurance Services Office. Fast Track data separates auto liability data into distinct coverages – bodily injury, property damage and personal injury protection – and has robust exposure data. Data from multiple companies are standardized. Data are direct – before reinsurance cessions – and subject to rigorous scrubbing for errors and omissions. It is also compiled quarterly, giving more recent and nuanced information.

The Fast Track data defines claim frequency as paid claims per 100 earned car-years. Loss severity is defined as paid losses – excluding defense and claim handling costs – divided by the number of claims.[9]

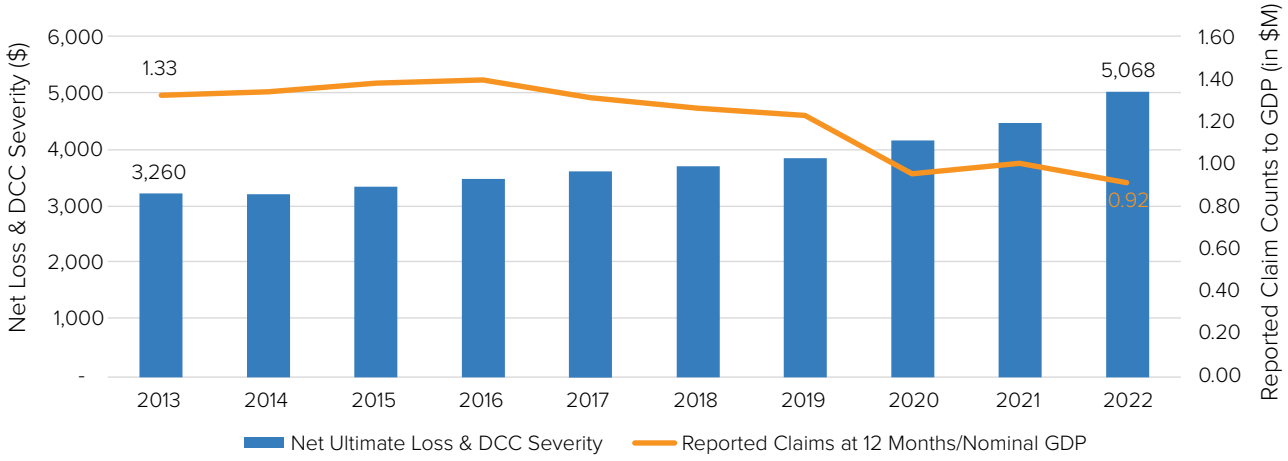
We find that Annual Statement and Fast Track data yield similar insights:

- Both data sources show claim frequency fell at the onset of the pandemic. Both sources show frequency remains below long-term trends. Fast Track data provides additional insight into trends from quarter to quarter.
- Both sources show claim severity rose steadily until 2019, then accelerated.

Chart 9 shows trends in severity and claim frequency based on Annual Statement data. Similar to commercial auto liability, frequency has been falling over time. That trend accelerated with the pandemic's onset in 2020. Since then, frequency has stayed below long-term trends.

Chart 9: Personal Auto Liability

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



8. J.D. Power, "Auto Insurance Customer Satisfaction Plummets as Rates Continue to Surge, J.D. Power Finds, June 13, 2023.

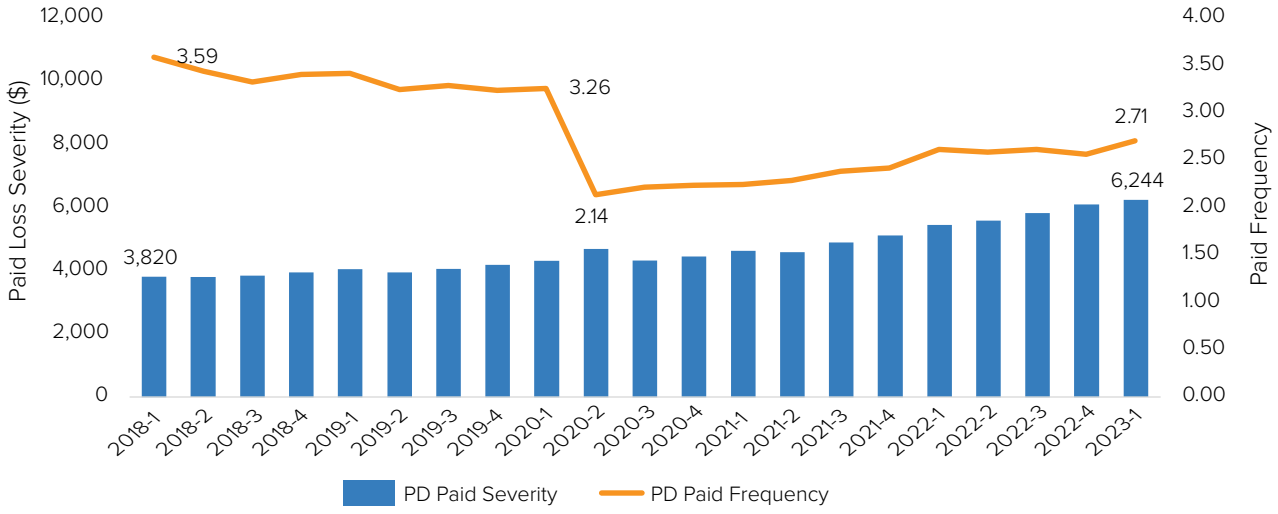
9. Fast Track and the Annual Statement have different exposure bases and handle the definition of a claim differently. For these reasons, comparisons of Fast Track data to Annual Statement data are not possible.

As with commercial auto liability, claim severity rose steadily until 2019, then accelerated. The personal auto liability claim severity compound annual increase was 3.0 percent from 2013 to 2019, then tripled to 9.2 percent compounded annually from 2019 to 2022.

Chart 10 shows frequency and severity data for property damage coverage from Fast Track. Frequency follows a steady downward trend from first quarter 2018 until first quarter 2020, when the pandemic began. Frequency plunges in the first full quarter of the pandemic, then rises steadily through first quarter 2023.

Chart 10: Personal Auto Liability

Frequency and Severity, Property Damage (PD) Coverage



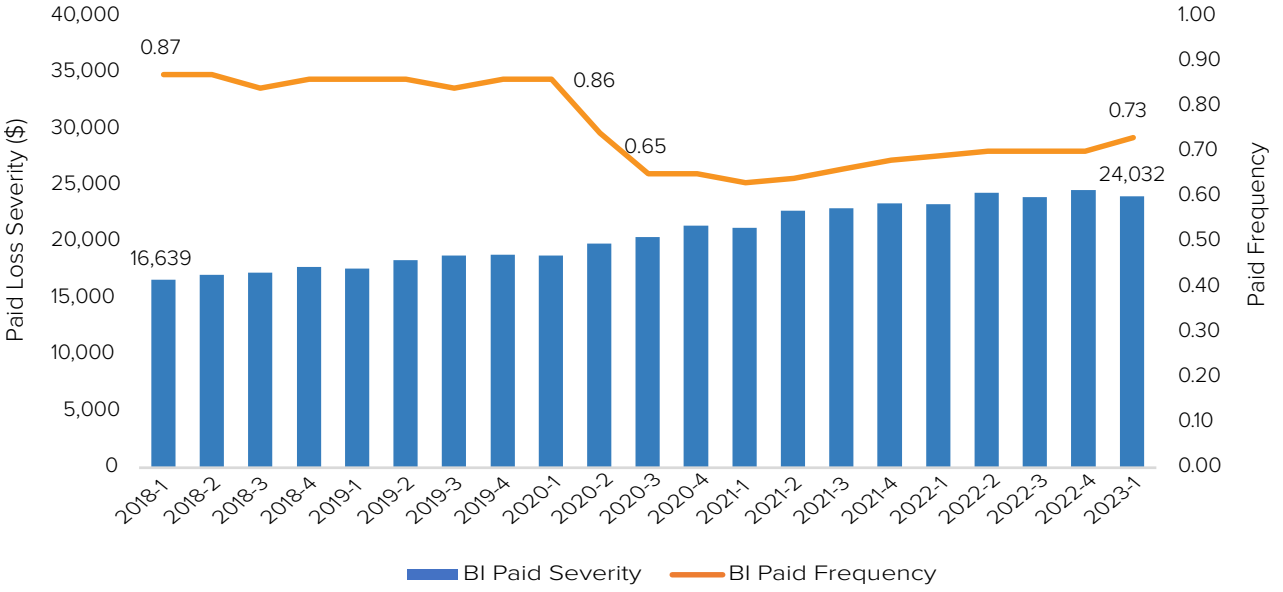
Source: Fast Track.

Severity rises at a 6.4 percent annual rate compounded until the beginning of the pandemic. Since then, it has risen at a 13.0 percent annual rate.

Chart 11 shows the same metrics for bodily injury coverage, with similar results. Frequency fluctuates slightly from first quarter 2018 to first quarter 2020. It falls sharply in second quarter 2020, fluctuating somewhat but generally rising through first quarter 2023.

Chart 11: Personal Auto Liability

Frequency and Severity, Bodily Injury (BI) Coverage



Source: Fast Track.

Severity rises at a 6.3 percent rate compounded until the beginning of the pandemic. Since then, it has risen at an 8.5 percent annualized rate.

These trends are similar to trends reported by the Insurance Research Council (IRC).[10] That organization also analyzed data on paid losses and exposures compiled by Fast Track.

IRC found that growth in bodily injury and property damage severity accelerated in the mid-2010s. Property damage claim severity grew at an annualized 2.2 percent rate from 2002 to 2012. That rose to 4.8 percent annualized from 2012 to 2019, then rose at a 12.2 percent annualized rate during the pandemic years. The acceleration is attributed to the rising cost of auto parts.[11]

Bodily injury claim severity exhibited similar behavior. It grew 3.2 percent annualized from 2002 to 2015, 4.6 percent annualized from 2015 to 2019 and 8.8 percent annualized from 2019 to 2022. The acceleration is attributed to "higher medical utilization, more expensive diagnostic procedures, cost shifting from other sources of compensation, and increased attorney involvement."[12]

Table 6 shows steady increases in CYR 12-60 LDFs for paid loss & DCC from 2011 to 2019, a decline during 2020, then increases in 2021 and 2022. The 2022 and 2021 CYR 12-60 LDFs are the highest and second-highest factors observed.

Table 6: 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	1.088	1.043	1.018	1.007	1.004	1.003		2.296
2015	1.733	1.187	1.090	1.045	1.016	1.009	1.006			2.320
2016	1.741	1.190	1.094	1.039	1.020	1.012				2.335
2017	1.750	1.199	1.085	1.045	1.026					2.344
2018	1.771	1.191	1.091	1.050						2.367
2019	1.769	1.200	1.099							2.429
2020	1.827	1.215								2.374
2021	1.972									2.499
2022										2.766

10. Insurance Research Council, "Trends in Personal Auto Insurance Claims, 2002-2022," 2023. One of the authors of this paper is president of the IRC.

11. Insurance Research Council, p. 23.

12. Insurance Research Council, p. 28.

Table 7 shows a similar pattern for case-incurred loss & DCC beginning in 2012 and having a one-year pause in 2014. The 2020 decline and subsequent increase are consistent with a slowdown in claim settlement in 2020 followed by a return to previous settlement patterns, including an element of increasing inflation. Consistent with the paid CYR 12-60 LDFs, the 2022 and 2021 case-incurred CYR 12-60 LDFs are the highest and second highest factors observed.

Table 7: Personal Auto Liability

Net Case-Incurred 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	1.160	1.057	1.028	1.010	1.005	1.002	1.001	1.001	1.001	
2004	1.156	1.055	1.026	1.010	1.004	1.002	1.001	1.000	1.001	
2005	1.159	1.056	1.027	1.010	1.004	1.002	1.001	1.001	1.000	
2006	1.172	1.059	1.025	1.009	1.003	1.002	1.001	1.001	1.000	
2007	1.180	1.055	1.026	1.009	1.004	1.002	1.001	1.001	1.000	1.281
2008	1.177	1.055	1.023	1.010	1.005	1.002	1.002	1.001	1.001	1.297
2009	1.164	1.051	1.024	1.011	1.005	1.003	1.002	1.001	1.001	1.286
2010	1.157	1.051	1.028	1.010	1.006	1.003	1.001	1.001	1.001	1.271
2011	1.170	1.061	1.026	1.013	1.005	1.003	1.001	1.001	1.001	1.254
2012	1.173	1.058	1.029	1.012	1.005	1.002	1.002	1.000	1.000	1.272
2013	1.175	1.064	1.029	1.012	1.004	1.004	1.001	1.001	1.001	1.293
2014	1.182	1.065	1.030	1.011	1.005	1.002	1.001	1.001		1.288
2015	1.192	1.067	1.029	1.012	1.005	1.003	1.002			1.312
2016	1.203	1.067	1.031	1.012	1.008	1.004				1.322
2017	1.205	1.070	1.030	1.016	1.009					1.337
2018	1.216	1.069	1.032	1.017						1.339
2019	1.209	1.074	1.035							1.359
2020	1.221	1.076								1.347
2021	1.273									1.375
2022										1.442

Charts 12 and 13 visualize the trends described. They also show the 2022 CYR 12-60 LDFs to be considerably higher than any predecessors.

Chart 12: Personal Auto Liability

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

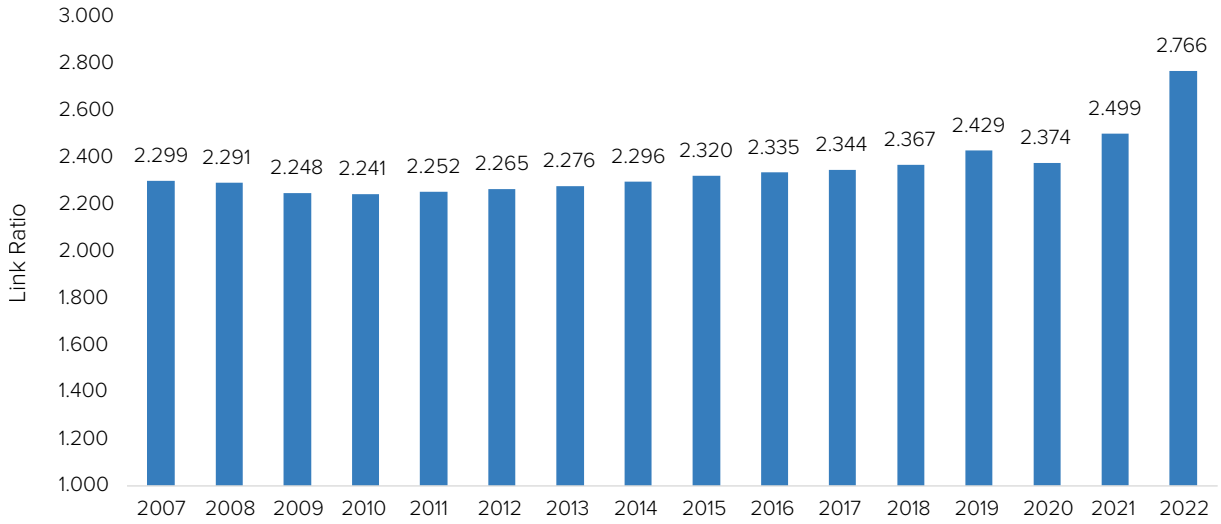


Chart 13: Personal Auto Liability

Net Case-Incurred Loss & DCC CYR 12 - 60 Loss Development Factors—P&C Industry

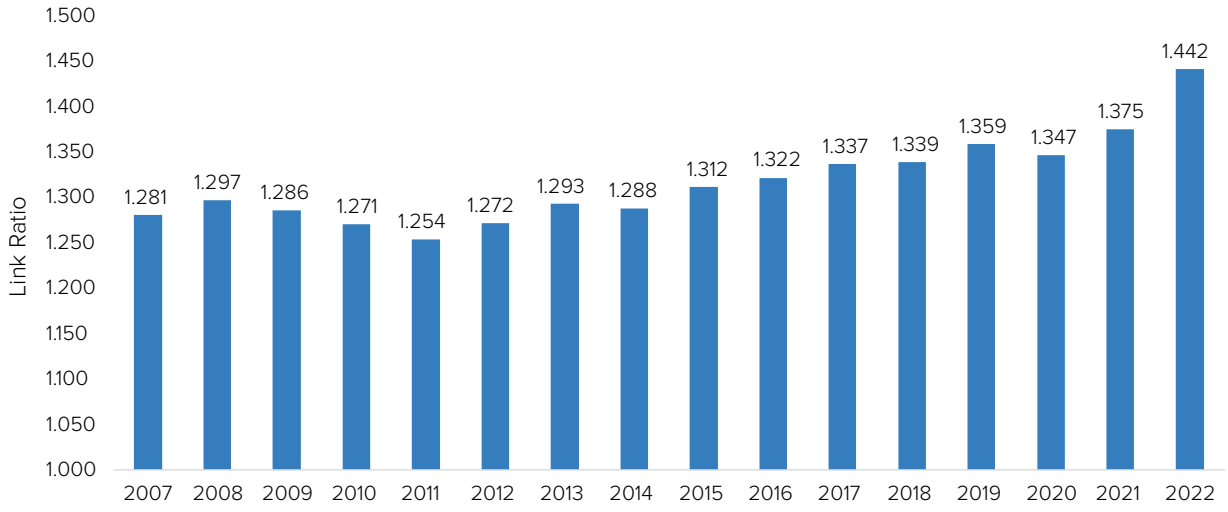


Table 8: Personal Auto Liability

Actual vs. Expected Net Loss and 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
2013	38,750	39,483	732	1.9%	14,711	16,189	1,477	10.0%
2014	40,050	41,072	1,022	2.6%	15,509	16,359	851	5.5%
2015	42,103	43,451	1,349	3.2%	16,731	18,332	1,601	9.6%
2016	45,775	46,783	1,007	2.2%	18,847	20,249	1,402	7.4%
2017	49,673	50,268	595	1.2%	20,821	22,586	1,765	8.5%
2018	51,837	52,590	754	1.5%	22,606	23,400	794	3.5%
2019	53,908	56,680	2,772	5.1%	23,857	25,681	1,824	7.6%
2020	57,251	56,433	(819)	-1.4%	25,800	25,883	82	0.3%
2021	51,762	54,809	3,047	5.9%	23,436	25,366	1,930	8.2%
2022	55,431	66,047	10,615	19.2%	26,077	31,792	5,715	21.9%
2013 - 2017	216,351	221,057	4,706	2.2%	86,619	93,715	7,096	8.2%
2013 - 2022	486,541	507,616	21,075	4.3%	208,396	225,837	17,441	8.4%
2018 - 2022	270,190	286,559	16,369	6.1%	121,777	132,121	10,345	8.5%

Table 8 shows that the emergence predicted by three-year average loss development factors has been consistently low. On a paid basis, the actual vs. expected emergence gap has been increasing. From calendar years 2013 to 2017, actual emergence was on average 2.2 percent higher than expected. From 2018 to 2022, actual emergence was 6.1 percent higher.

On a case-incurred basis, from 2013 to 2022 actual emergence averaged about 8 percent higher than predicted – 8.4 percent from 2013 to 2022. Case-incurred actual emergence in 2022 was more than $5.7 billion above the expected emergence.

For paid losses, three of the latest four years had the worst actual vs. expected emergence variance in the decade. For paid losses, 2019 and 2021 had actual emergence exceeding expected by more than 5 percent. In 2022, actual emergence exceeded expected by 19 percent. Before 2019, emergence hadn't exceeded estimated by more than 3.2 percent.

Case-incurred actual emergence exceeded expectations by more than 7 percent in 2019, 2021 and 2022. Unlike the paid emergence, case-incurred emergence in 2019 and 2021 was not out of line with prior years. However, 2020 emergence was very close to expectations. In 2022, actual emergence exceeded expectations by more than 20 percent – twice as high as any other year in the past 10.

The overall pattern is consistent with steadily increasing inflation. The expected emergence captures inflation patterns from prior years used for loss development factor calculations but does not anticipate increasing inflation.

Table 9: 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
Year	Per 12/31/YYYY Schedule P		Per 12/31/2022 Schedule P	Implied Net Ultimate Loss & DCC using Alternative LDFs		Variance to Booked	
	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)
2013	30,639	55,511	73,234	73,378	72,160	144	-1,074
2014	32,093	58,064	77,092	76,860	75,479	-232	-1,613
2015	35,205	63,803	85,691	84,313	82,938	-1,378	-2,753
2016	37,632	67,981	92,680	90,125	88,370	-2,554	-4,310
2017	37,671	68,469	94,179	90,220	89,004	-3,959	-5,175
2018	38,677	70,522	98,032	92,629	91,673	-5,403	-6,359
2019	40,292	74,054	103,316	96,497	96,264	-6,819	-7,052
2020	31,684	59,751	85,357	75,882	77,671	-9,476	-7,686
2021	37,452	72,473	106,563	89,694	94,208	-16,869	-12,355
2022	43,447	81,717	118,852	104,054	106,226	-14,798	-12,626
Total	**364,791**	**672,346**	**934,995**	**873,651**	**873,993**	**-61,345**	**-61,002**
					% Variance	-6.6%	-6.5%

Table 9 shows estimates of the increase in losses attributable to increasing inflation to be $61 billion from 2013 to 2022. The range is narrow: $61.0 billion using case-incurred estimation methods vs. $61.3 billion using paid methods. These constitute between 6.5 percent and 6.6 percent of booked ultimate losses.

The impact on personal auto liability is smaller on a percentage basis than on commercial auto liability, where the impact is between 18.8 and 23.6 percent. Personal auto claims settle faster for reasons cited above; smaller private passenger vehicles on average cause less damage than larger commercial vehicles. Lower policy limits and the lack of well-capitalized defendants result in faster settlements."

Though increasing inflation appears to have a smaller impact on a percentage basis, dollar estimates for personal auto are considerably larger than the commercial auto estimates – more than $60 billion vs. $35.1 billion to $43.9 billion. This is because personal auto liability is a much larger line.

These estimates understate the inflationary impact because the methodology does not capture inflationary trends in the first 12 months of an accident year. Personal auto liability has a much greater proportion of settlements in that first 12 months, so this methodology will capture a smaller share of its increasing inflation.

Chart 14: Personal Auto Liability

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

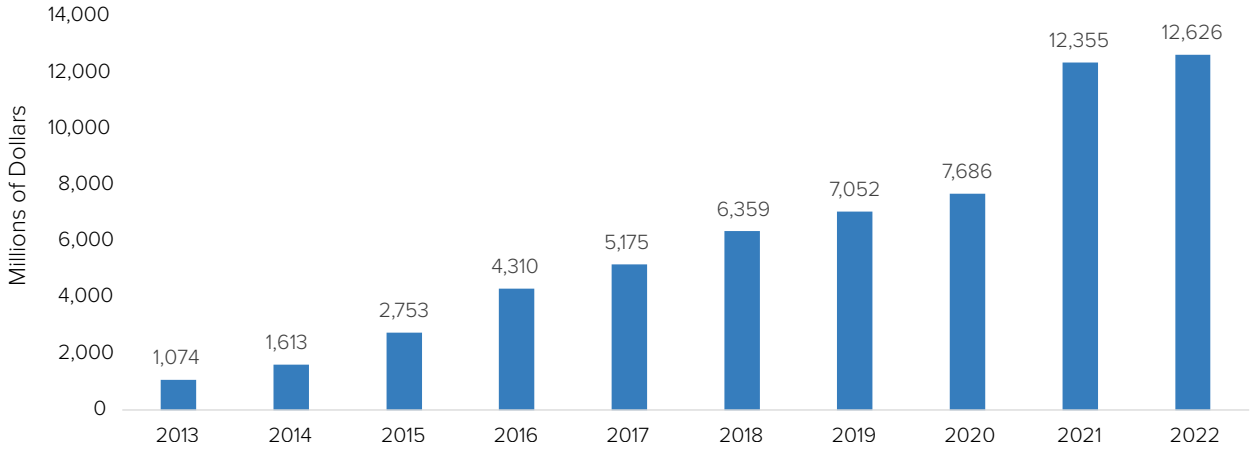


Chart 14 uses the case-incurred estimate of the impact of increasing inflation to show how the impact steadily climbed until 2021, when it grew 61 percent, to $12.4 billion. It grew again in 2022 to $12.6 billion. The jump in 2021 coincides with a large increase in the economic inflation rate. The growing impacts through 2020 can be attributed to greater presence of social inflation.

Table 10: 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
Year	Per 12/31/2022 Schedule P	Implied Net Ultimate Loss & DCC using Alternative LDFs		Implied Average Annual Impact of Increasing Inflation	
	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	73,234	73,378	72,160	0.0%	0.3%
2014	77,092	76,860	75,479	0.1%	0.4%
2015	85,691	84,313	82,938	0.2%	0.5%
2016	92,680	90,125	88,370	0.3%	0.6%
2017	94,179	90,220	89,004	0.5%	0.6%
2018	98,032	92,629	91,673	0.6%	0.7%
2019	103,316	96,497	96,264	0.6%	0.6%
2020	85,357	75,882	77,671	1.0%	0.8%
2021	106,563	89,694	94,208	1.3%	1.0%
2022	118,852	104,054	106,226	1.0%	0.8%
Total	**934,995**	**873,651**	**873,993**	**0.6%**	**0.6%**

The average annual impact of increasing inflation is less than 1 percent, as shown in Table 10. However, the impact in individual years is quite different. The impact was negligible through 2014, followed by single-digit annual impacts from 2015-2019, and then double-digit annual impacts from 2020-2022.

The impact is higher in commercial auto liability (between 2 and 3 percent annually). The aforementioned differences between the lines (policy limits, types of vehicles insured, absence or presence of excess policies and well-capitalized corporations) have tended to hold inflationary costs lower in personal auto liability business, on a percentage basis.

Conclusions for personal auto liability:

- Though both have fluctuated over the past 20 years, premium and losses have grown more slowly than the overall economy. In recent years, losses have been growing faster than premium. Since Accident Year 2020, standardized premium fell 13 percent, while losses rose 15 percent.
- Severity increased dramatically after 2019. The compound annual increase was 3.0 percent from 2013 to 2019, then tripled to 9.2 percent compounded annually.
- Increasing inflation raised losses $61 billion or about 6.5 percent higher than they would have been for the years 2013 to 2022. Inflation increased sharply in 2021 and 2022.

Conclusions

Combined, increasing inflation has driven personal and commercial auto losses higher by between $96.1 billion and $105.2 billion from 2013 to 2022. That is between 8.6 percent and 9.4 percent of $1.1 trillion of booked losses in that period. The impact on personal auto is greater than on commercial auto in absolute dollars (more than $60 billion vs. $35.1 billion to $43.9 billion) but not as great on a percentage basis (about 6.5 percent vs. between 18.8 and 23.6 percent).

For both personal and commercial auto liability lines, social inflation was the main source of increasing inflation before 2021. For 2021 and later, increasing inflation came from a combination of economic inflation and social inflation.

There is evidence of a slowdown in claims payments in calendar years 2020 and 2021, likely triggered by slowdowns in court cases and other effects of the pandemic.

The average annual impact of increasing inflation is approximately 0.6 percent per year for personal auto liability and between 2.3 percent and 2.7 percent for commercial auto liability.

Personal auto liability typically has lower policy limits than commercial auto liability, insures smaller vehicles on average, and doesn't cover well-capitalized corporations. All of these make the impact of increasing inflation lower in personal auto on a percentage basis. The dollar impact on society is greater than that of commercial auto because personal auto is so much larger.

This estimate is likely understated because it does not capture the impact of increasing inflation that occurs in the first 12 months of an accident year. That understatement likely affects personal auto liability, with its shorter development tail, more than it affects commercial auto liability.

This paper shows how traditional actuarial tools offer significant insights into inflationary trends. These trends could be explored further by analyzing more homogeneous data sets of direct insurance results (before consideration of reinsurance cessions), such as those prepared by large companies and rating organizations. Such analysis could home in on specific classes of business. It could continue to look for inflationary trends in loss development factors, or could explore other metrics.

Actuarial techniques can document a phenomenon like inflation, but generally offer less insight into what causes underlie the phenomenon. Economic analysis could shed further light on the causes of increasing inflation, including a deeper exploration of interactions between social inflation, economic inflation, and other intermediary variables.

Appendix I

We use Annual Statement data for Personal Auto Liability and Commercial Auto Liability as of December 31, 2022, from Schedule P as submitted to the National Association of Insurance Commissioners. Older Schedule P evaluations were also used to broaden the triangle history from 10 years to 20. We access the data via S&P Global Market Intelligence, which accumulates the submissions of individual companies and adjusts the data for intragroup reinsurance cessions.

We used paid loss and defense and cost containment triangles from Schedule P, Part 3. We developed case-incurred loss triangles by subtracting 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 examined claim counts reported in Schedule P, Part 5.

Annual Statement data have characteristics that must be considered in any analysis. Losses are net of reinsurance and are affected by the decisions of individual companies. There are also issues of homogeneity, credibility, development patterns, reinsurance and operational changes that are important at a company level but have much less impact when working with industrywide data.

Information on claim counts is handled differently from company to company, making absolute calculations difficult to interpret, but we believe the data is revealing of trends over time. We assume that individual company changes have minimal effect at a countrywide industry level.

As an estimate of exposures, we use Bureau of Labor Statistics data for nominal Gross Domestic Product. We assume that property/casualty insurance exposures grow at a similar rate as the economy.

We look for patterns in age-to-age loss development patterns. Basic actuarial techniques such as the chain-ladder method assume that losses move from unreported to reported in a predictable way. In their analysis, actuaries assume that loss development is a random process with a stable mean. If link ratios are continually rising, that is evidence of increasing inflation.[13]

13. Lynch and Moore, 2022, pp. 6-8, and Lynch and Moore, 2023, p 3.

Appendix II

Given the effect of the pandemic on the judicial system, it is worth modeling how a slowdown in claims payment would affect loss development patterns.

A number of factors influence how a slowdown affects claim development, including:

- The shape of the development pattern affected. The change in LDFs for a portfolio that experiences uniform incremental development – 100 in period one; 100 in period two; 100 in period three, etc. – will differ from one whose development tapers quickly – 500 in period one; 50 in period two; 5 in period three, etc.
- The amount of losses that move from one period to a later one. All else equal, the more losses that move from period to period, the greater the change in development factors.
- How long the slowdown in claims handling lasts.
- Whether all periods of development are affected equally. A slowdown might only affect new claims, or only old ones.
- How much inflation affects losses that are shifted from one period to the next.

We create a model that begins with calendar year 2019 paid loss development factors for commercial auto liability through 84 months and no development after 84 months. We assume $1 million in losses paid in the first 12 months of each accident year. We assume no random variation in development factors and no inflation over time.

We shock that model across three accident years, which assumes two years of slowdown and one year to recover:

- In calendar year 8, the model moves 5 percent of losses in each development period into the next development period.
- In calendar year 9, we increase the slowdown by the same amount as in calendar year 9.
- In calendar year 10, all losses are returned to the pre-shocked period.

Table II-A shows the cumulative loss triangle that results. The areas shaded green are the default development pattern. The areas shaded yellow are the years of the slowdown. The area shaded brown is the year the slowdown ends.

Table II-A: Commercial Auto Liability

Loss Development with 5 Percent Slowdown for Two Years, Then Recovery

Acc Year	12	24	36	48	60	72	84	96
1	1,000,000	2,359,000	3,562,090	4,577,286	5,195,219	5,491,347	5,650,596	5,650,596
2	1,000,000	2,359,000	3,562,090	4,577,286	5,195,219	5,491,347	5,642,633	5,650,596
3	1,000,000	2,359,000	3,562,090	4,577,286	5,195,219	5,476,540	5,634,671	5,650,596
4	1,000,000	2,359,000	3,562,090	4,577,286	5,164,323	5,461,734	5,650,596	5,650,596
5	1,000,000	2,359,000	3,562,090	4,526,526	5,133,426	5,491,347	5,650,596	
6	1,000,000	2,359,000	3,501,936	4,475,766	5,195,219	5,491,347		
7	1,000,000	2,291,050	3,441,781	4,577,286	5,195,219			
8	950,000	2,223,100	3,562,090	4,577,286				
9	900,000	2,359,000	3,562,090					
10	1,000,000	2,359,000						
11	1,000,000							

Table II-B shows the loss development factors that result. Note that factors fall in the slowdown years, grow in the year the slowdown ends and return to the default pattern the year *after* the slowdown ends.

Table II-B: Commercial Auto Liability

Expected LDFs with Slowdown

Acc Year	12-24	24-36	36-48	48-60	60-72	72-84	84-96	CYR 12-60 LDF
1	2.359	1.510	1.285	1.135	1.057	1.029	1.000	
2	2.359	1.510	1.285	1.135	1.057	1.028	1.001	
3	2.359	1.510	1.285	1.135	1.054	1.029	1.003	
4	2.359	1.510	1.285	1.128	1.058	1.035	1.000	
5	2.359	1.510	1.271	1.134	1.070	1.029		5.195
6	2.359	1.485	1.278	1.161	1.057			5.195
7	2.291	1.502	1.330	1.135				5.195
8	2.340	1.602	1.285					4.876
9	2.621	1.510						5.095
10	2.359							6.483
11								5.195

Chart II-A compares the modeled CY 12-60 LDFs to the actual factors for commercial auto liability from 2019 to 2022. The actual development pattern is broadly consistent with a two-year slowdown in claims payments. However, there are too many unmodeled variables to conclude that a slowdown is the only reason development factors have emerged as they have since 2019.

Chart II-A: Commercial Auto Liability

Net Paid Loss & DCC CYR 12 - 60 Loss Development Factors—Actual vs. Model