Trends, Challenges and Opportunities in the Personal Auto Insurance Industry

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Presentation Overview

- P/C Industry Financial Overview and Outlook
  - Claim trends as a driver of underwriting performance

- Drivers of Personal Lines Growth
  - Price
  - Exposure

- Role of the Economy and Claiming Behavior

- Personal Lines Growth Drivers

- Personal Auto Claim Trend Analysis

- Personal Auto Underwriting, Loss Ratio and Profitability

- Auto Insurer Disruptors and InsurTech
P/C Insurance Industry
Financial Overview

CATS Claims, Non-CAT Underwriting
Losses in Personal and Commercial Auto
Impacted Insurer Balance Sheets

Industry Remains Strong, But Major Differences Between
Personal and Commercial Lines Growth Prospects

- 2005 ROE* = 9.6%
- 2006 ROE = 12.7%
- 2007 ROE = 10.9%
- 2008 ROE = 0.1%
- 2009 ROE = 5.0%
- 2010 ROE = 6.6%
- 2011 ROAS1 = 3.5%
- 2012 ROAS1 = 5.9%
- 2013 ROAS1 = 10.2%
- 2014 ROAS1 = 8.4%
- 2015 ROAS = 8.4%
- 2016 ROAS = 6.2%
- 2017E ROAS = 4.2%*

- ROE figures are GAAP; 1Return on avg. surplus. Excluding Mortgage & Financial Guaranty insurers yields a 8.2% ROAS in 2014, 9.8% ROAS in 2013, 6.2% ROAS in 2012, 4.7% ROAS for 2011, 7.6% for 2010 and 7.4% for 2009; 2016E is annualized figure based actual figure through Q3 of $31.8B.

Sources: A.M. Best, ISO; USC RUM Center estimate (2017 based on actual NIAT of $22.352 though Q3 and ROAS of 4.2%).
Profitability Peaks & Troughs in the P/C Insurance Industry, 1975 – 2017:Q3

ROEs in 2017 plunged to their lowest levels since 2001 and 9/11. This creates extreme pricing pressure.

1977: 19.0%
1987: 17.3%
1997: 11.6%
2006: 12.7%
2013: 8.4%
2015: 6.2%
2016 6.2%
2017E 4.2%

*Est. for 2017 based on actual ROAS of 4.45 through Q2; Profitability = P/C insurer ROEs. 2011-16 figures are estimates based on ROAS data. Note: Data for 2008-2014 exclude mortgage and financial guaranty insurers.
Source: NAIC, ISO, A.M. Best, Conning, USC RUM Center estimates.
P/C Profitability Is Influenced Both by Cyclicality and Volatility

*2017 Estimate based on actual ROAS through Q3 of 4.2% with USC Center for Risk and Uncertainty Management estimate for the full year.
Sources: ISO, Fortune; USC RUM Center.
As Recently as 2001, Insurers Paid Out Nearly $1.16 for Every $1 in Earned Premiums

Heavy Use of Reinsurance Lowered Net Losses

Relatively Low CAT Losses, Reserve Releases

Higher CAT Losses, Shrinking Reserve Releases, Toll of Soft Market

Sharply higher CATs are driving large underwriting losses and pricing pressure

Best Combined Ratio Since 1949 (87.6)

Cyclical Deterioration

Avg. CAT Losses, More Reserve Releases

Sandy Impacts

Lower CAT Losses

Relatively Low CAT Losses, Reserve Releases

P/C Insurance Industry Combined Ratio, 2001–2017:Q3*


Sources: A.M. Best, ISO (2014-2015); Figure for 2010-2013 is from A.M. Best P&C Review and Preview, Feb. 16, 2016.
Personal Lines Combined Ratio: 2006–2017E

Personal Lines Underwriting Losses Rose in 2017 Due to Record CATs and Adverse Auto Severity

Source: A.M. Best (2006-2016); USC RUM (2017E using actual 9 mo. YTD combined ratio of 102.8).
Commercial Lines Combined Ratio, 1990-2017F*

Commercial lines underwriting performance deteriorated materially in 2017 as record CATs, diminishing prior year reserves, rising loss cost trends and pricing pressure in some lines are pushing combined ratios higher.

Source: A.M. Best (1990-2016); ISO (2017E).
CATS Eat Cars Too!

Catastrophe Loss Update: Major Driver of Rate Pressure

2017 Was One of the Costliest Years Ever for US Insurers:

Hurricanes Harvey, Irma and Maria, California Wildfires Exact a Huge Toll
U.S. Insured Catastrophe Losses, 1989 – 2017 YTD*

2017 is likely to become the second costliest year ever for insured CAT losses in the US


Note: 2001 figure includes $20.3B for 9/11 losses reported through 12/31/01 ($25.9B 2011 dollars). Includes only business and personal property claims, business interruption and auto claims. Non-prop/BI losses = $12.2B ($15.6B in 2011 dollars.)

Sources: Property Claims Service/ISO; Insurance Information Institute.
Top 10 US Catastrophe Losses of 2017, by Insured Loss

(Insured Losses, 2017 Dollars, $ Billions)*

YTD insured CAT losses in the US totaled $72 billion by late 2017, the second costliest year on record, led by Hurricanes Maria, Irma and Harvey

Not all insured losses in 2017 were due to hurricanes. More than $15B in other losses occurred from coast-to-coast.

*As of Nov. 14, 2017.
Inflation Adjusted U.S. Catastrophe Losses by Cause of Loss, 1997–2016¹

1. Catastrophes are defined as events causing direct insured losses to property of $25 million or more in 2016 dollars.
2. Excludes snow.
3. Does not include NFIP flood losses
4. Includes wildland fires
5. Includes civil disorders, water damage, utility disruptions and non-property losses such as those covered by workers compensation.
Source: ISO’s Property Claim Services Unit.

**Wind losses, by far, cause the most catastrophe losses, even if hurricanes/TS are excluded.**

**Hurricanes & Tropical Storms, $161.1**

**Wind losses, by far,**

**Events Involving Tornadoes (2), $168.1**

**Tornado share of CAT losses is rising**

**Winter storms losses were much above average in 2014/15 pushing this share up**

**Other Wind/Hail/Flood (3), $29.7**

**Other (5), $0.8**

**Fires (4), $8.4**

**Insured cat losses from 1997-2016 totaled $421.2B, an average of $21.1B per year or $1.76B per month**
INVESTMENTS: THE NEW REALITY

Investment Performance is a Key Driver of Insurer Profitability

The “Trump Bump” Has Lifted Stock Markets and Interest Rates

Will the Gains Help Insurers?
Investment earnings in 2017E were still ~14% below their 2007 pre-crisis peak.

Due to persistently low interest rates, investment income fell in 2012, 2013 and 2014 but showed a small (1.7%) increase in 2015—though 2016 experienced another decline. Up ~2% in 2017.

1 Investment gains consist primarily of interest and stock dividends. Sources: ISO; Insurance Information Institute.
*2017 estimate based on annualized $35.4B actual figure through Q3 2017.
The yield on invested assets remains low relative to pre-crisis yields. Fed rate increases beginning in late 2015 have pushed up some yields, albeit quite modestly. Shrinking of Fed’s balance sheet should help too in 2018 and beyond.

Sources: NAIC data, sourced from S&P Global Market Intelligence; 2017 estimate is based on ISO data through Q3 2017.
Brief P/C Insurance Growth Overview and Outlook

Drivers of Growth in 2018

Economic Growth Fuels Exposure & Record CAT Losses Are Pressuring Rates

Price Competition Remains Rational While Others Looks Towards M&A

Outlook
2017E: 4.1%
2018F: 4.5%

*Q3:2017 over Q3:2016. Shaded areas denote “hard market” periods
Since 2014, personal lines Direct Premiums Written have generally grown faster than commercial lines DPW, and that growth has been less volatile.

Sources: NAIC, via SNL Financial; ISO; Insurance Information Institute calculations.
The Strength of the Economy Will Greatly Influence Growth in Insurers’ Exposure Base Across Most Lines

Claiming Behavior Is Influenced by the Economy as Well
US Real GDP Growth*

Demand for Insurance Should Increase in 2018-19 as GDP Growth Continues at a Steady and Perhaps Accelerating Pace and Gradually Benefits the Economy Broadly

* Estimates/Forecasts from Blue Chip Economic Indicators.
Source: US Department of Commerce, Blue Economic Indicators 3/18; Insurance Information Institute.

Outlook: Consumers are optimistic about the future, which is consistent with expectations for stronger economic growth (consumers account for nearly 70% of all spending in the economy). Should positively influence business investment.

Source: The Conference Board; Wells Fargo Research.
Auto/Light Truck Sales, 1999-2023F

Sales have returned to pre-crisis levels

Job growth and improved credit market conditions boosted auto sales to near record levels in recent years

Yearly car/light truck sales are slowing slightly, as demand tapers following the recovery from the recession. PP Auto premium might grow by 3.5% - 5%.

Source: U.S. Department of Commerce; Blue Chip Economic Indicators (1/18 for 2018-19; 10/17 for 2019-23F; Insurance Information Institute 29
New Private Housing Starts, 1990-2023F

Job growth, low inventories of existing homes, still-low mortgage rates and demographics should continue to stimulate new home construction for several more years.

New home starts plunged 72% from 2005-2009; A net annual decline of 1.49 million units, lowest since records began in 1959.


Insurers Are Continue to See Meaningful Exposure Growth in the Wake of the “Great Recession” Associated with Home Construction: Construction Risk Exposure, Surety, Commercial Auto; Potent Driver of Workers Comp Exposure.
The Nov/Dec. 2017 unemployment rate was 4.1%, a 17-year low

Unemployment forecasts have been revised modestly downwards. Optimistic scenarios put the unemployment as low as 3.6 by Q4 2018.
Rate and Exposure are Both Presently Important Growth Drivers
Top Growth Factors: Personal Lines

- **Rate**: Favorable rate trends in both auto and home
  - Adverse severity trends are pressuring personal auto
  - Record CAT losses in 2017 will further pressure comprehensive

- **Economic Strength**: Economic growth, supported by low unemployment, rising consumer confidence are supporting strength in new auto sales, new home construction, tax cuts

- **Household Formation**: Millennials are finally becoming car and home buyers in larger numbers, driving exposures upward

- **High Net Worth Consumers**: This segment has seen consistent (and profitable) growth as the “wealth effect” grows

- **Driving More**: Americans are behind the wheel more than ever

- **Market Discipline**: Major personal lines insurers remain generally price disciplined
Monthly Change in Auto Insurance Prices, 1991–2018*

Cyclical peaks in PP Auto tend to occur roughly every 7-10 years (early 1990s, early 2000s, early and late 2010s)

Last pricing peak occurred in late 2010 at 5.3%, falling to 2.8% by Mar. 2012

"Hard" markets often tend to occur during recessionary periods

Feb. 2018 reading of 9.7% is up from 7.6% a year earlier. Current rate trend is strongest since 2002-2003.

*Percentage change from same month in prior year; through Feb. 2018; seasonally adjusted

Note: Recessions indicated by gray shaded columns.

Sources: US Bureau of Labor Statistics; National Bureau of Economic Research (recession dates); Insurance Information Institutes.
Personal Auto Insurance: Key CPI Cost Component Changes: 2018 vs. 2017*

Percentage Change (%)


The price of auto insurance increased by nearly four times the overall pace of inflation from 2008-2017 as frequency and severity trends deteriorated as the economy recovered and vehicles repair and medical costs rose.
Private Passenger Auto Insurance
Net Written Premium, 2000–2018F

PP Auto premiums written continue to recover from a period of flat growth attributable to the weak economy impacting new vehicle sales, car choice, and increased price sensitivity among consumers.

PPA NWP volume in 2017 was up an estimated $62.8B or 39.9% since the 2009 trough; By 2017 the gain is expected to be $76.8B or 48.9%.

PPA will generate $10B - $14B in new premiums annually through 2018.

Sources: A.M. Best (1990-2016); USC RUM (2017F-2018F).
Direct Premiums Written: Pvt. Passenger Auto
Percent Change by State, 2007-2016

Top 25 States

Source: NAIC data, sourced from S&P Global Market Intelligence, Insurance Information Institute.

Bottom 25 States

Source: NAIC data, sourced from S&P Global Market Intelligence, Insurance Information Institute.
Direct Premiums Written: **Commercial Auto**

Percent Change by State, 2007-2016

Top 25 States

ND’s energy boom has fueled growth in every line

Source: NAIC data, sourced from S&P Global Market Intelligence, Insurance Information Institute.
Direct Premiums Written: Commercial Auto Percent Change by State, 2007-2016

Bottom 25 States

ID  NJ  MS  OH  OR  ME  NV  MA  VA  UT  CT  SC  MD  NC  NM  WY  NH  WV  RI  AZ  VT  AL  AK  HI  SD
10.7 9.7 8.8 8.7 8.3 8.0 7.6 7.0 7.0 6.2 5.5 5.4 4.0 3.0 2.1 1.0 -0.5 -1.9 -2.6 -3.9 -4.3 -5.8 -6.1 -8.3 -21.3

Source: NAIC data, sourced from S&P Global Market Intelligence, Insurance Information Institute.
Auto Average Expenditure 2015: Highest 25 States

Sources: NAIC via SNL Financial; Insurance Information Institute.
Auto Average Expenditure 2015: Lowest 25 States

Sources: NAIC via SNL Financial; Insurance Information Institute.
Homeowners Insurance Net Written Premium, 2000–2018F

Homeowners insurance NWP continues to rise (up 152% 2000-2017E) despite very little unit growth during the real estate crash. Reasons include rate increases, especially in coastal zones, ITV endorsements (e.g., “inflation guards”), compulsory for mortgaged properties and resumption of home building activity.

The Homeowners line will generate about $1.5B in new premiums annually through 2018.

Sources: A.M. Best; USC RUM Center.

Source: NAIC data, sourced from S&P Global Market Intelligence, Insurance Information Institute.
Direct Premiums Written: Homeowners MP
Percent Change by State, 2007-2016

Bottom 25 States

Source: NAIC data, sourced from S&P Global Market Intelligence, Insurance Information Institute.
State of the Personal Lines Market

Auto Frequency and Severity Are an Immediate Challenge

Homeowners Majorly Impacted by CATs in 2017

Homeowners is Now Outperforming Pvt. Pass. Auto and P-C Industry as a Whole. HO Volatility is Associated Primarily With Coastal Exposure Issues

*Latest available.
**Excludes 1992, the year of Hurricane Andrew. If 1992 is included the resulting homeowners RNW is 2.2%
Sources: NAIC; Insurance Information Institute.

Auto Insurance Profitability Remains Well Below Pre-Crisis Levels (12% vs. ~1%) and Far Below the Fortune 500 (13% vs. ~1%)

SOURCE: National Association of Insurance Commissioners.

Source: NAIC via SNL Financial; Insurance Information Institute.

Average 2000–2016
U.S.: 5.7%

Private Passenger Auto Underwriting Performance Is Showing the Strains of Rising Frequency (and Severity) Trends in Many States

Sources: A.M. Best (1990-2016); USC RUM Center (2017E).
Homeowners Insurance Combined Ratio: 1990–2017E

Homeowners Performance Had Improved Markedly Since 2011/12’s Large Cat Losses…until 2017’s Record Catastrophe Loss Activity.

Sources: A.M. Best (1990-2016); USC RUM Center (2017E).
Commercial Auto Combined Ratio: 1993–2017F

Commercial Auto Results Are Challenged as Rate Gains Have Yet to Fully Offset Adverse Frequency and Severity Trends

Sources: A.M. Best (1990-2016); USC RUM Center (2017E).
Change in Commercial Rate Renewals, by Line: 2017:Q3

Percentage Change (%)

-2.3%  0.1%  0.1%  0.4%  0.4%  0.7%  0.9%  7.3%

Workers Comp  General Liability  Cyber  Umbrella  Surety  Business Interruption  Construction  D&O  EPL  Commercial Property  Commercial Auto

Commercial Auto was only major line with materially positive renewals in 2017

Commercial Property, Business Interruption will need to reflect record CAT losses and pressure from reinsurance markets

Note: CIAB data cited here are based on a survey. Rate changes earned by individual insurers can and do vary, potentially substantially.

Source: Council of Insurance Agents and Brokers; USC Center for Risk and Uncertainty Management.
Claim Trends in Private Passenger Auto Insurance

Rising Frequencies and Severities in Many Coverages

Will that Pattern Be Sustained?
Passenger Vehicle Collision Coverage Insurance Losses by Vehicle Type, 2014-2016 Model Years

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Severity</th>
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<tbody>
<tr>
<td>Passenger Cars &amp; Minivans</td>
<td>8.3%</td>
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<tr>
<td>Pickups</td>
<td>6.4%</td>
</tr>
<tr>
<td>SUVs</td>
<td>6.5%</td>
</tr>
<tr>
<td>All</td>
<td>7.4%</td>
</tr>
</tbody>
</table>

Cars and minivans have the highest collision claim frequencies and severities.

SOURCE: Highway Loss Data Institute.
A Half Century-Plus of Auto Insurance: Frequency vs. Severity

In the Long Run, Frequency Falls. Severity Increases.

- Frequency
  - Property Damage: 7.92, 4.22, 3.57, 0.0
  - Bodily Injury: 2.61, 1.23, 0.91, 0.0

- Severity
  - Property Damage: $183, $1,288, $3,673, $7,553
  - Bodily Injury: $1,143, $1,143, $1,143, $16,007

*Four quarters ending in Q3:2017
Sources: Insurance Institute for Highway Safety, Insurance Services Office, Insurance Information Institute.
Bodily Injury: Severity Trend Is Up, Frequency Decline Returning?

Annual Change, 2005 through 2017*

BI Severity Trend is a Major Cost Driver

*2017 figure is for the 4 quarters ending 2017:Q3.
Source: ISO/PCI Fast Track data; Insurance Information Institute
Property Damage Liability: Severity Up and Frequency Flat

Annual Change, 2005 through 2017*

Severity/Frequency Trends Have Been Volatile, But Rising Severity since 2011 Is a Concern

*2017 figure is for the 4 quarters ending 2017:Q3.
Source: ISO/PCI Fast Track data; Insurance Information Institute
PIP: Severity Trend Is Up, Frequency Decline Returning?

No-Fault (PIP) Trends Have Been Volatile

*2017 figure is for the 4 quarters ending 2017:Q3.
Source: ISO/PCI Fast Track data; Insurance Information Institute
Collision Coverage: Severity & Frequency Trends Are Both Higher in 2017*

Annual Change, 2005 through 2017*

The Recession, High Fuel Prices Helped Temper Frequency and Severity, But this Trend Has Clearly Reversed, Consistent with Experience from Past Recoveries

*Four quarters ending with 2017 Q3.
Source: ISO/PCI Fast Track data; Insurance Information Institute
Comprehensive Coverage: Frequency and Severity Trends Are Volatile

Annual Change, 2005 through 2017*

Severe weather is a principal cause of the spikes in both frequency and severity.

Weather Creates Volatility for Comprehensive Coverage. Comprehensive Losses Were Up 24.9% in Q3:2017 Due Largely to Hurricanes Harvey and Irma

*2017 figure is for the 4 quarters ending with 2017:Q3.
Source: ISO/PCI Fast Track data; Insurance Information Institute
Loss Ratio Analysis: Private Passenger Auto Insurance

Lost Ratios Have Generally Risen Over the Past Several Years
Private Passenger Auto Underwriting Performance Is Showing the Strains of Rising Frequency (and Severity) Trends in Many States

Sources: A.M. Best (1990-2016); USC RUM Center (2017E).
Private Passenger Auto Insurance Loss Ratios Have Been Rising for A Decade and ROEs Have Been Falling.

The Loss Ratio Across All Physical Damage Coverages Has Trended Generally Upward for Years

*2017 figure is for the 4 quarters ending in 2017:Q3
Source: ISO/PCI Fast Track data; Insurance Information Institute
All Liability Coverages Loss Ratio Is Up: Private Passenger Auto, 2012 – 2017*

Bodily Injury Loss Ratios Have Trended Generally Upward for Years

*2017 figure is for the 4 quarters ending in 2017:Q3
Source: ISO/PCI Fast Track data; Insurance Information Institute
The Loss Ratio Across All Physical Damage Coverages Has Trended Generally Upward for Years

*2017 figure is for the 4 quarters ending in 2017:Q3
Source: ISO/PCI Fast Track data; Insurance Information Institute
Collision Loss Ratio Trending Upward: Private Passenger Auto, 2010 – 2017*

Loss Ratio

Collision Loss Ratios Were Trending Steadily Upward Until Early 2017

*2017 figure is for the 4 quarters ending in 2017:Q2
Source: ISO/PCI Fast Track data; Insurance Information Institute

*2017 figure is for the 4 quarters ending in 2017:Q3
Source: ISO/PCI Fast Track data; Insurance Information Institute
A Few Factors Driving Adverse Private Passenger Auto Loss Trends

More Jobs, Better Economy, More People Driving, More Expensive Cars, Higher Speed Limits…
America is Driving More Again: 2000-2017

Tremendous Growth In Miles Driven. The More People Drive, the More Frequently They Get Into Accidents.

*Moving 12-month total vs. prior year through December.
Sources: Federal Highway Administration; Insurance Information Institute.
People Drive to and from Work and Drive to Entertainment. Out of Work, They Curtail Their Movement.

Sources: Federal Highway Administration; Seasonally Adjusted Employed from Bureau of Labor Statistics via FRED; Insurance Institute for Highway Safety; Insurance Information Institute.
More People Working and Driving

When People are Out of Work, They Drive Less. When They Get Jobs, They Drive to Work, Helping Drive Claim Frequency Higher.

Sources: Seasonally Adjusted Employed from Bureau of Labor Statistics; Rolling four-quarter average frequency from Fast Track Monitoring System; Insurance Information Institute.
More Miles Driven => More Collisions
2006-2017:Q2

The More Miles People Drive, the More Likely They are to Get in an Accident, Helping Drive Claim Frequency Higher.

Sources: Federal Highway Administration; Rolling four-quarter average frequency from Fast Track Monitoring System; Insurance Institute for Highway Safety; Insurance Information Institute.
Does Spending on Vehicles Affect Claim Severity?

As the Economy Has Gotten Better, People Are Spending More on Vehicles – When Those Cars Are in Accidents, Severity Increases.

A Few Factors Driving Adverse Private Passenger Auto Loss Trends

More Jobs, Better Economy, More People Driving, Lower Gas Prices, More Expensive Cars, Higher Speed Limits…
Driving Has Been Getting Safer For Decades, But Recent Trend Is Discouraging—40,200 Deaths in 2016—Little Improvement in 2017

*2017 estimate from NSC data.
Collision Repair Cost Drivers

The Bottom Line:
High Tech Vehicles Are Expensive to Repair
### “Key to Key”: Vehicle Repair Times Are Increasing, 2013-2017

<table>
<thead>
<tr>
<th>Driveable Flag</th>
<th>CY</th>
<th>Vehicle Into Repairs Started Days Avg</th>
<th>Repairs Started to Repairs Completed Days Avg</th>
<th>Repairs Completed to Vehicle Out Days Avg</th>
<th>Vehicle Into Vehicle Out Days Avg</th>
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<td>Non-Driveable</td>
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**Source:** CCC accessed via PropertyCasualty360.com at: [https://www.propertycasualty360.com/native/?mvi=204cd819dffd479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bb8c0ebe08e5a1c9&mvpflabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&slreturn=20180205153245](https://www.propertycasualty360.com/native/?mvi=204cd819dffd479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bb8c0ebe08e5a1c9&mvpflabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&slreturn=20180205153245)**

- **Driveable** +0.6 days (+18.9%)
- **Non-Driveable** +2.3 days (+20.3%)
- **Total** +1.0 days (+15.2%)
Direct Repair Program Vehicle Volume by Repair Cost Range and Drivability, 2013-2017

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<td>3.2%</td>
<td>3.0%</td>
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<td>29.5%</td>
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<td>11.2%</td>
<td>11.5%</td>
<td>11.7%</td>
<td>12.1%</td>
<td>12.4%</td>
</tr>
<tr>
<td>$4,000.01 to $5,000.00</td>
<td>7.1%</td>
<td>7.3%</td>
<td>7.3%</td>
<td>7.7%</td>
<td>7.9%</td>
</tr>
<tr>
<td>$5,000.01 to $6,000.00</td>
<td>4.5%</td>
<td>4.7%</td>
<td>4.7%</td>
<td>5.0%</td>
<td>5.1%</td>
</tr>
<tr>
<td>$6,000.01 to $10,000.00</td>
<td>6.8%</td>
<td>7.1%</td>
<td>7.1%</td>
<td>7.7%</td>
<td>7.8%</td>
</tr>
<tr>
<td>$10,000.01 to $15,000.00</td>
<td>1.6%</td>
<td>1.7%</td>
<td>1.7%</td>
<td>1.9%</td>
<td>1.8%</td>
</tr>
<tr>
<td>$15,000.01 to $20,000.00</td>
<td>0.30%</td>
<td>0.31%</td>
<td>0.34%</td>
<td>0.38%</td>
<td>0.37%</td>
</tr>
<tr>
<td>$20,000.01 &amp; Up</td>
<td>0.10%</td>
<td>0.10%</td>
<td>0.11%</td>
<td>0.14%</td>
<td>0.13%</td>
</tr>
<tr>
<td>Non-Driveable %</td>
<td>22.1%</td>
<td>19.5%</td>
<td>18.2%</td>
<td>18.1%</td>
<td>17.3%</td>
</tr>
</tbody>
</table>

Source: CCC accessed via PropertyCasualty360.com at: https://www.propertycasualty360.com/native/?mvi=204cd819d7fd479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bb8c0ebe08e5a1c9&mvpflabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&sreturn=20180205153245

Repair costs have been drifting upward

Non-drivable share has been declining
Cycle time increases almost exponentially with repair cost.
Productivity of repairs falls dramatically for more expensive jobs.

Source: CCC accessed via PropertyCasualty360.com at:
https://www.propertycasualty360.com/native/?mvi=204cd819dfft479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bbb8c0ebe08e5a1c9&mvpflabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&sreturn=20180205153245
Unsurprisingly, customer satisfaction with both the repair shop and insurer drops as repair cost (and therefore repair time) rises.
Unsurprisingly, customer satisfaction with both the repair shop and insurer drops as repair cost (and therefore repair time) rises.
Household energy demand arising from vehicles will continue to soar

*Includes plug-in vehicles and hybrids.

EVs market share in the US is growing, rapidly but us still tiny

*Includes plug-in vehicles and hybrids.

INDUSTRY DISRUPTORS

Technology, Society and the Economy Are All Changing at a Rapid Pace

*Reality vs. Drinking the Silicon Valley Kool Aid*
The Internet of Things and the Insurance Industry Value Chain

Who owns the data? Where does it flow? Who does the analytics? Who is the capital provider?

The Sharing Economy Has Grown—and Attracted Political Scrutiny

There’s no question that the hype around autonomous vehicles far exceeds the reality.
The Internet of Things and the Insurance Industry

- The “Internet of Things” will create trillions in economic value throughout the global economy by 2025
- What opportunities, challenges will this create for insurers?
- What are the impact on the insurance industry “value chain”?

Sources: McKinsey Global Institute, *The Internet of Things: Mapping the Value Beyond the Hype*, June 2015; Insurance Information Institute.
Media is Obsessed with Driverless Vehicles: Often Predicting the Demise of Auto Insurance

By 2035, it is estimated that 25% of new vehicle sales could be fully autonomous models.

Questions

- Are auto insurers monitoring these trends?
- How are they reacting?
- Will Google or (Amazon) take over the industry?
- Will the number of auto insurers shrink?
- How will liability shift?

Source: Boston Consulting Group.
A Few of the (Many) Technological Hurdles Facing Autonomous Vehicles

<table>
<thead>
<tr>
<th>Tech Hurdle</th>
<th>Discussion of Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inability to Operate Safely in All Weather Conditions</td>
<td>Heavy rain, snow, fog and compromise radar and lidar sensor technologies, requiring humans to intervene</td>
</tr>
<tr>
<td>Driving Safely Despite Unclear Lane Markings</td>
<td>Vehicle can have difficulty making guidance decisions when lines on roads are faint or absent.</td>
</tr>
<tr>
<td>Reliably Recognizing Traffic Lights that Are Not Working Properly</td>
<td>If lights are out (e.g., power outage), vehicle has no understanding of how to operate. Requires that a machine be taught human intuition understand cooperation among multiple vehicles as well as external input from non-drivers (e.g., police)</td>
</tr>
<tr>
<td>Ability to Respond to Spoken Commands or Hand Signals from Law Enforcement, Highway Safety Employees, Construction Crews, Pedestrians, Cyclists, etc.</td>
<td>Verbal instructions, eye contact, hand signals, gesturing all play extremely important roles in driving, more so than is generally appreciated or understood.</td>
</tr>
</tbody>
</table>

Source: Adapted from: Technologists Face Hurdles Before They Take Wheel, John Markoff, New York Times, June 8, 2017.
I.I.I. Poll: Driverless Cars

Why Americans Would Not Want to Ride in a Driverless Car, May 2016

Safety Concerns Are Paramount Among Those Who Would Avoid Driverless Cars.

Based on those who would not ride in a driverless car. Respondents could give more than one answer.
Source: Insurance Information Institute Annual Pulse Survey.
Car Subscription Services: A Threat to Personal Auto?

- Liberty Mutual, Assurant, Chubb have struck multiple deals

- Volvo, Ford, Cadillac, Porsche, BMW and Mercedes-Benz have either launched or announced plans to launch car subscription models

Source: CB Insights accessed 3/14/18 at: https://www.cbinsights.com/research/insurance-car-subscription-partnerships/
Car Subscription Services: A Threat to Personal Auto?

- Ford’s Canvas programs states that it provides: BI & PD Liability $300K combined single limit), PIP, Med Pay, UI/UIM, Collision & Comprehensive ($500 deductible), Roadside Assistance, Rental Reimbursement

- No flexibility in coverage but can use own auto insurance as primary and Canvas as excess

Car Subscription Services: Insurers Partnering with US Car Subscription and Sharing Programs

The car subscription service is tiny—and how much it will grow is uncertain;

For auto manufacturers car subscriptions are a variation on leasing. For auto insurers, there is a more meaningful distinction (e.g., personal or commercial exposure).

Source: CB Insights accessed 3/14/18 at: https://www.cbinsights.com/research/insurance-car-subscription-partnerships/
Distribution by Channel Type Continues to Evolve Around the World
Independent agents have lost significant personal lines market share since the early 1970s. That trend slowed from 2000-2007, but accelerated during the financial crisis, though it may be slowing again.
INSURANCE TECHNOLOGY: FIN TECH ZEROES IN

Number and Value of Deals Is Increasing

An Industry that Has Always Been Accepting of Change and Innovation
Insurance tech deals reached a new record in 2016 but funding was higher in 2015.

2 out of every 3 InsurTech deals in 2016 was at the early stage!
Top 25 P/C Insurers by Direct Written Premium, 2015

Are large P/C insurers more likely to invest in InsurTech start-ups?

Sources: NAIC from CB Insights at https://www.cbinsights.com/blog/largest-pc-insurers-rank-startup-investments/
Start-Up InsurTech Investments by Top 25 P/C Insurers, 2015 - 2017*

10 of the Top 25 P/C insurers have made InsureTech start-up investments since 2015.— but there is little correlation between size and number of investments within this group.

USAA and AmFam lead in P/C InsurTech investment

*As of June 23, 2017.
Sources: NAIC from CB Insights at https://www.cbinsights.com/blog/largest-pc-insurers-rank-startup-investments/
Thank you for your time and your attention!

Twitter: twitter.com/bob_hartwig

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