

# Trends, Challenges and Opportunities in the Personal Auto Insurance Industry

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# Presentation Overview

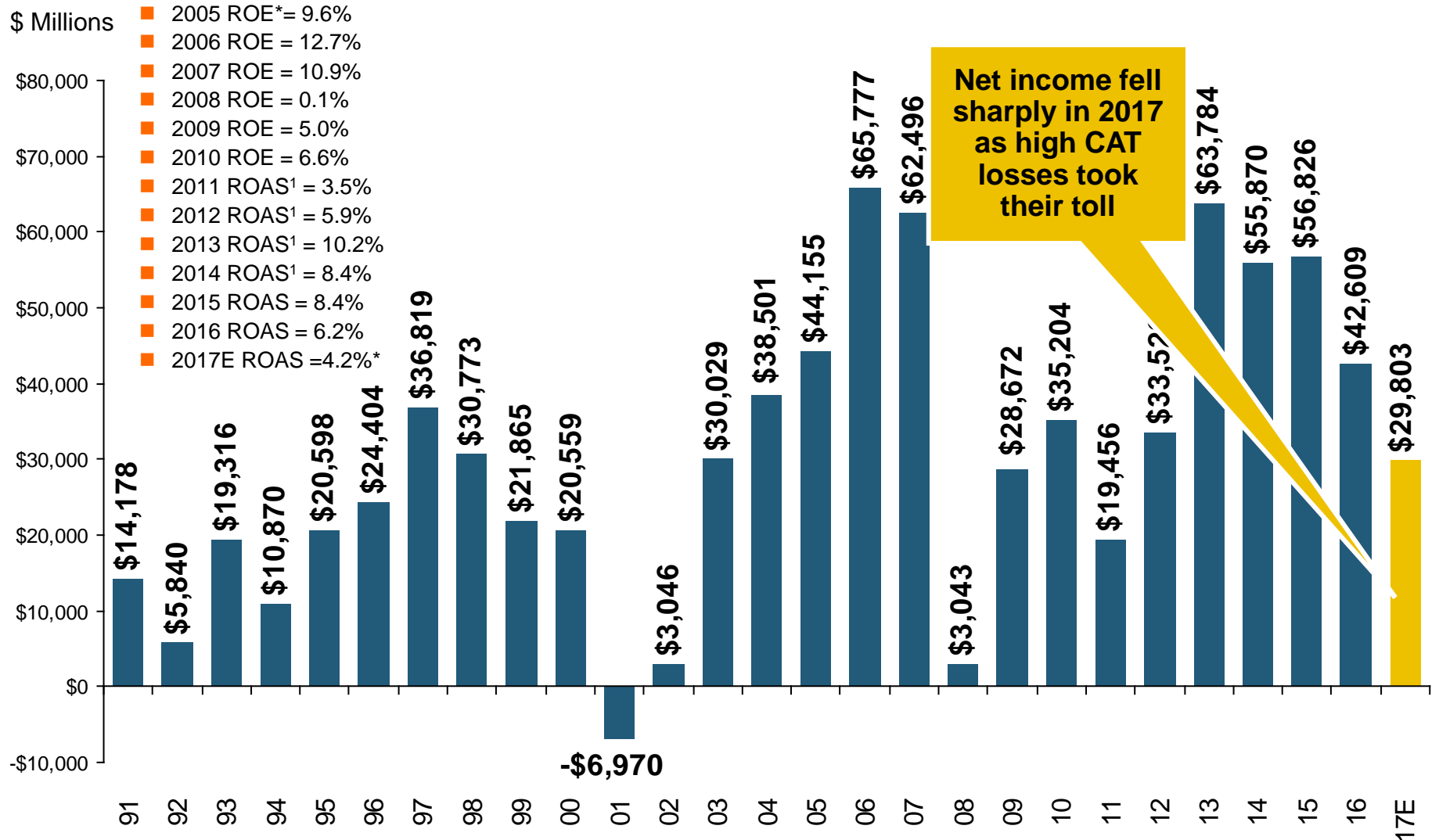
- **P/C Industry Financial Overview and Outlook**
  - ◆ **Claim trends as a driver of underwriting performance**
- **Drivers of Personal Lines Growth**
  - ◆ **Price**
  - ◆ **Exposure**
- **Role of the Economy and Claiming Behavior**
- **Personal Lines Growth Drivers**
- **Personal Auto Claim Trend 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***

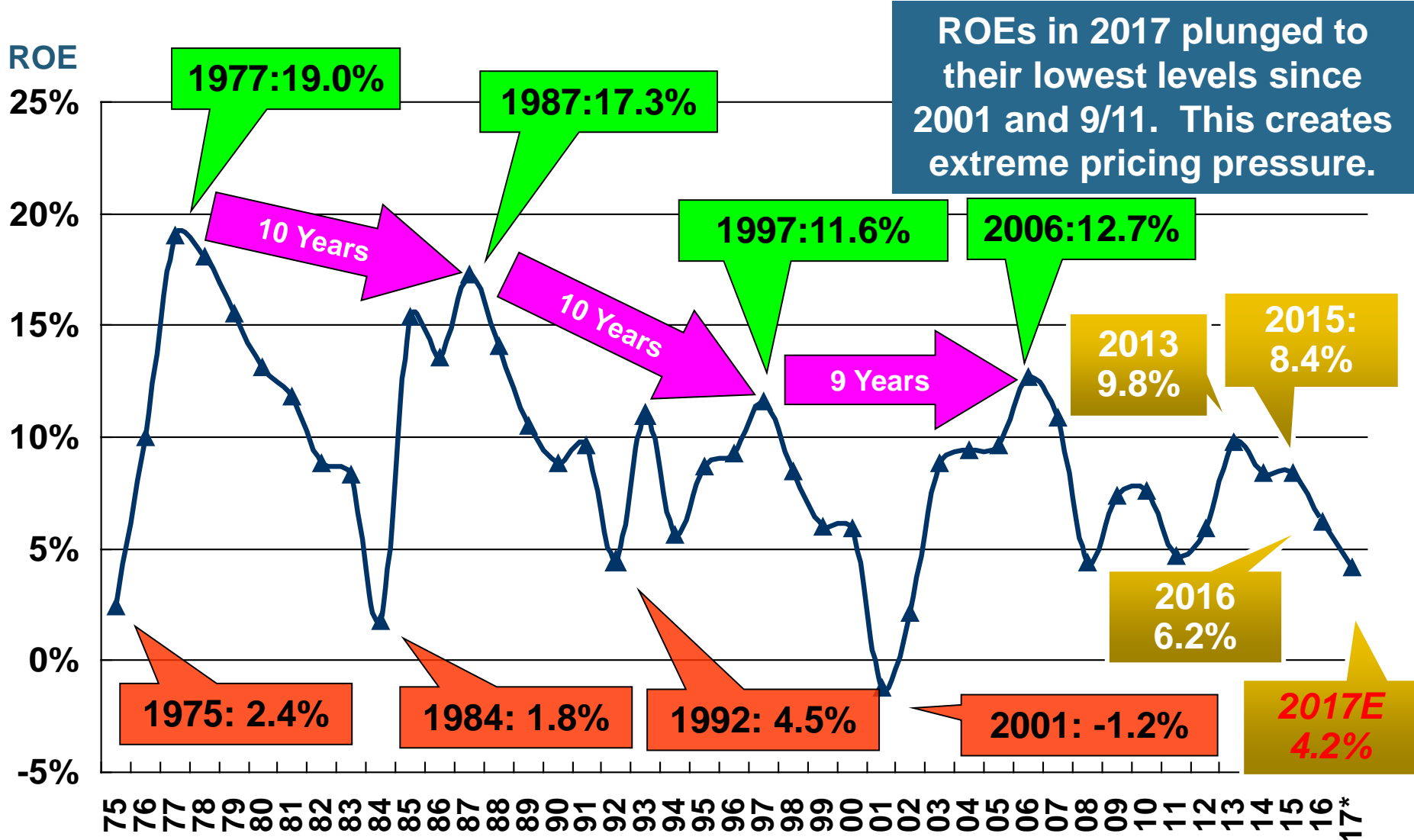
# P/C Industry Net Income After Taxes 1991–2017E



Net income fell sharply in 2017 as high CAT losses took their toll

\*ROE figures are GAAP; <sup>1</sup>Return 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

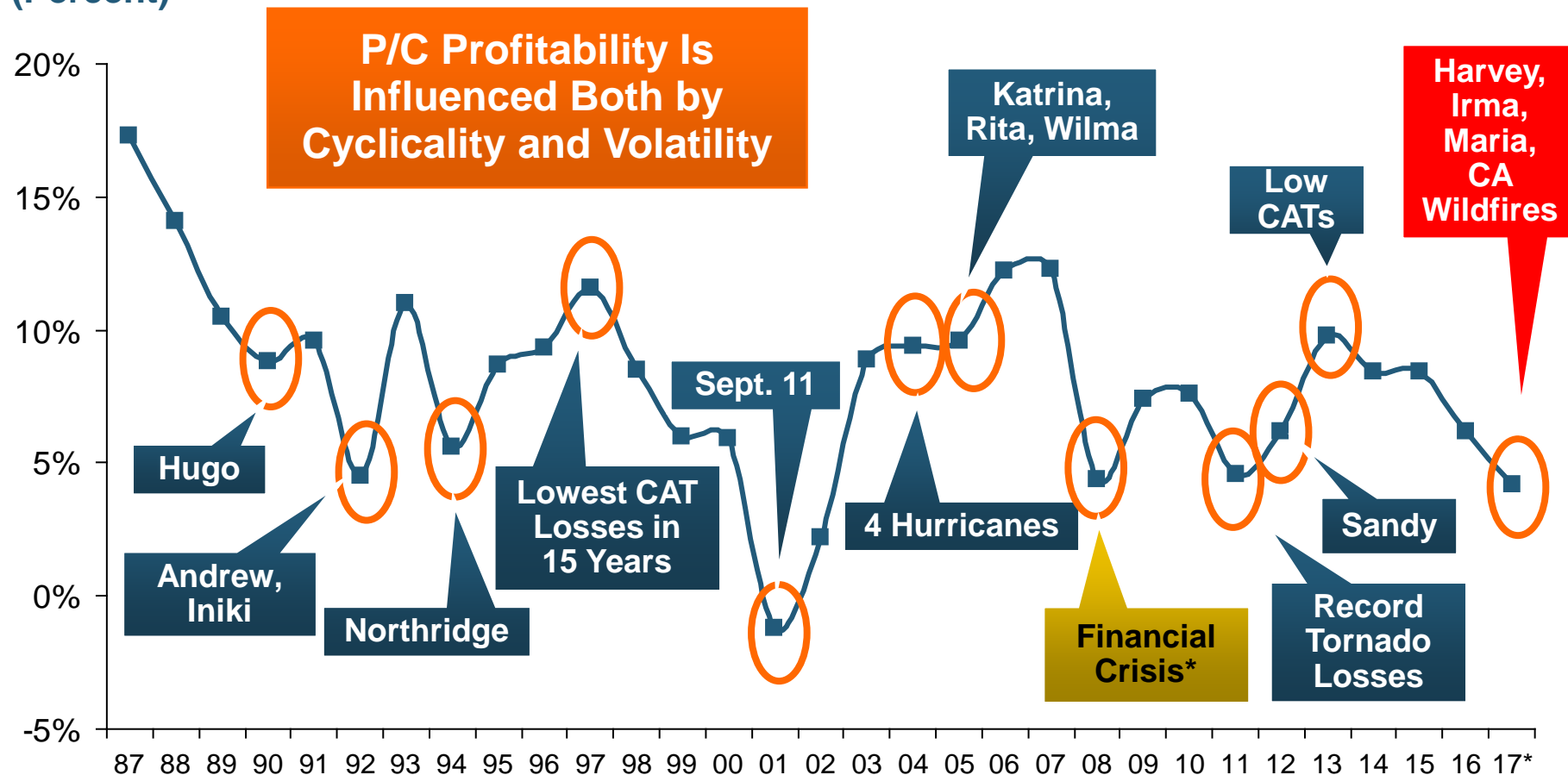


\*Est. for 2017 based on actual ROAs of 4.45 through Q2; Profitability = P/C insurer ROEs. 2011-16 figures are estimates based on ROAS data. Note: Data for 2008-2014 exclude mortgage and financial guaranty insurers.

Source: NAIC, ISO, A.M. Best, Conning, USC RUM Center estimates.

# ROE: Property/Casualty Insurance by Major Event, 1987–2017E

(Percent)

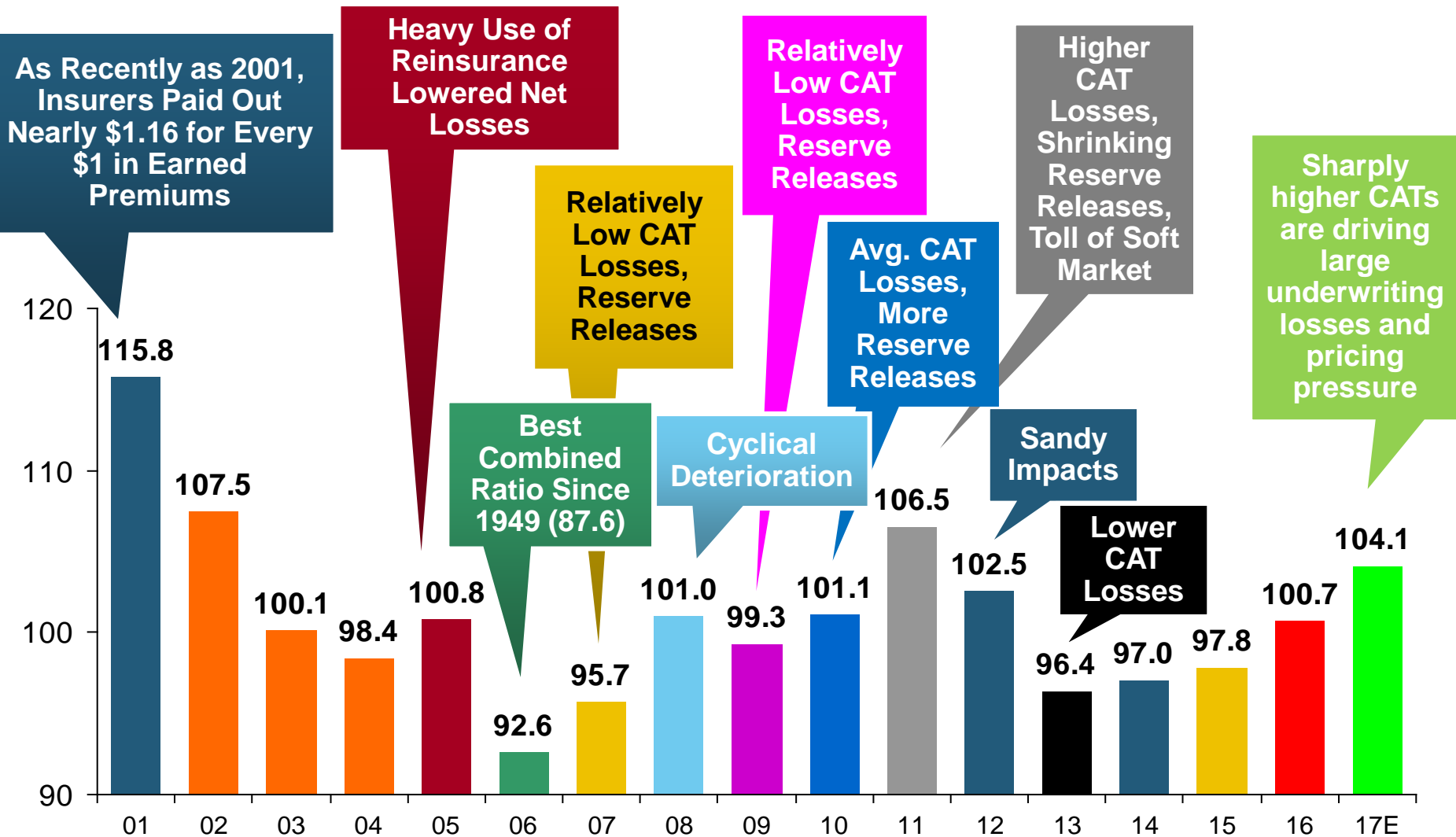


\*2017 Estimate based on actual ROAS through Q3 of 4.2% with USC Center for Risk and Uncertainty Management estimate for the full year.

Excludes Mortgage & Financial Guarantee in 2008 – 2014.

Sources: ISO, *Fortune*; USC RUM Center.

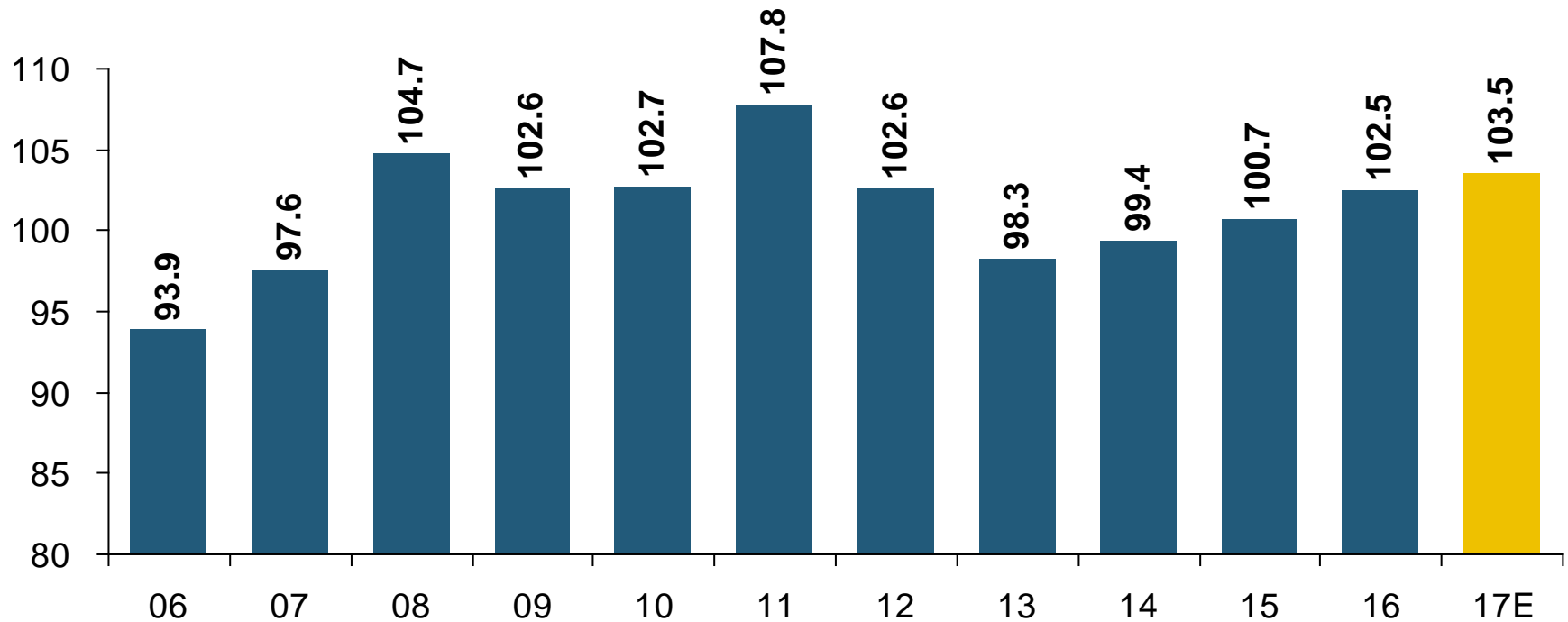
# P/C Insurance Industry Combined Ratio, 2001–2017:Q3\*



\* Excludes Mortgage & Financial Guaranty insurers 2008--2014. Including M&FG, 2008=105.1, 2009=100.7, 2010=102.4, 2011=108.1; 2012:=103.2; 2013: = 96.1; 2014: = 97.0.; 2017 (est.) based on actual 104.1 through Q3 (Q3 combined ratio alone was 110.7).

Sources: A.M. Best, ISO (2014-2015); Figure for 2010-2013 is from A.M. Best P&C Review and Preview, Feb. 16, 2016.

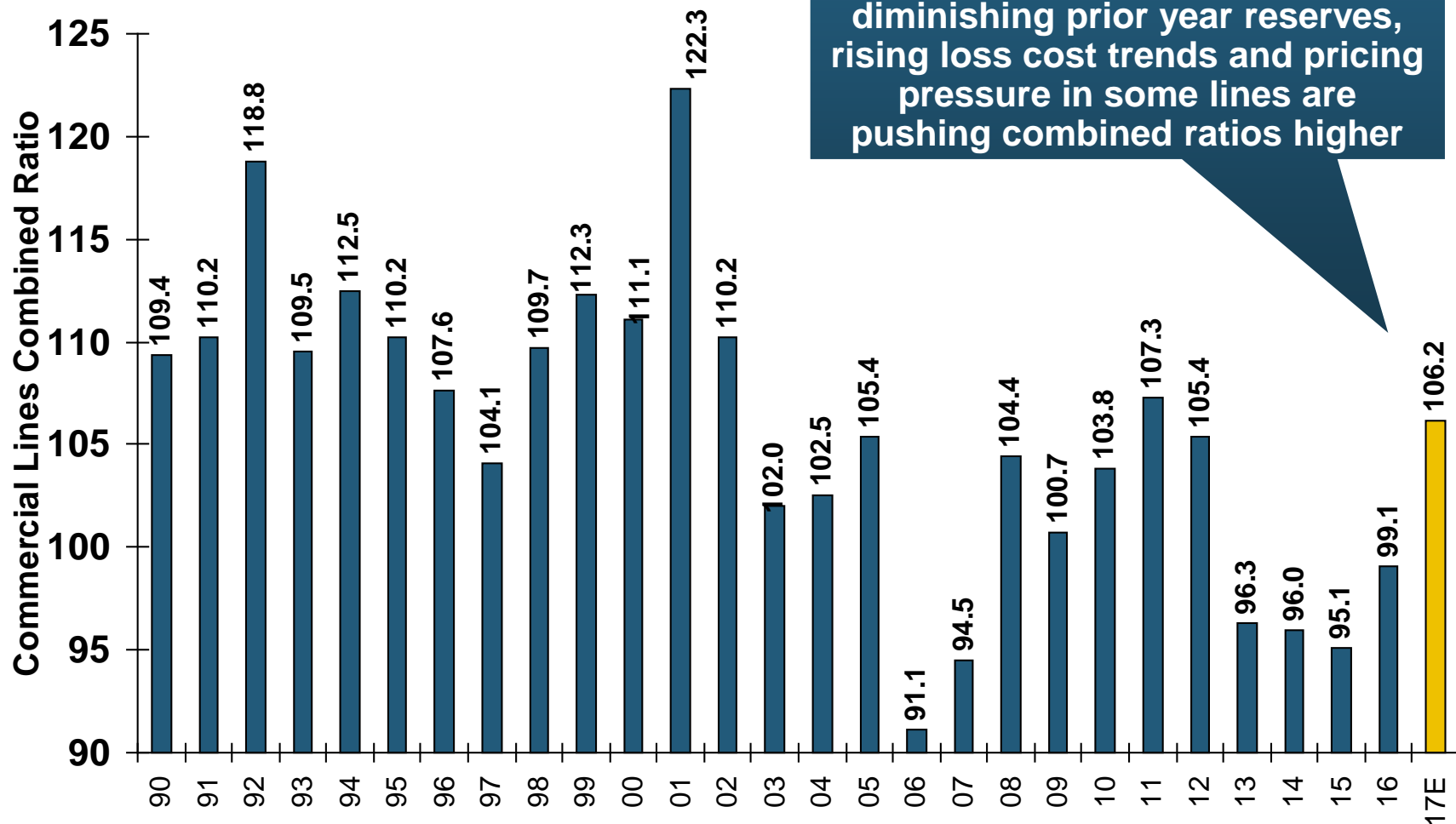
# Personal Lines Combined Ratio: 2006–2017E



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



# 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

\*2007-2012, 2017 figures exclude mortgage and financial guaranty segments. 17E = actual 9 mo. YTD figure of 106.2. Source: A.M. Best (1990-2016); ISO (2017E).

# CATS Eat Cars Too!

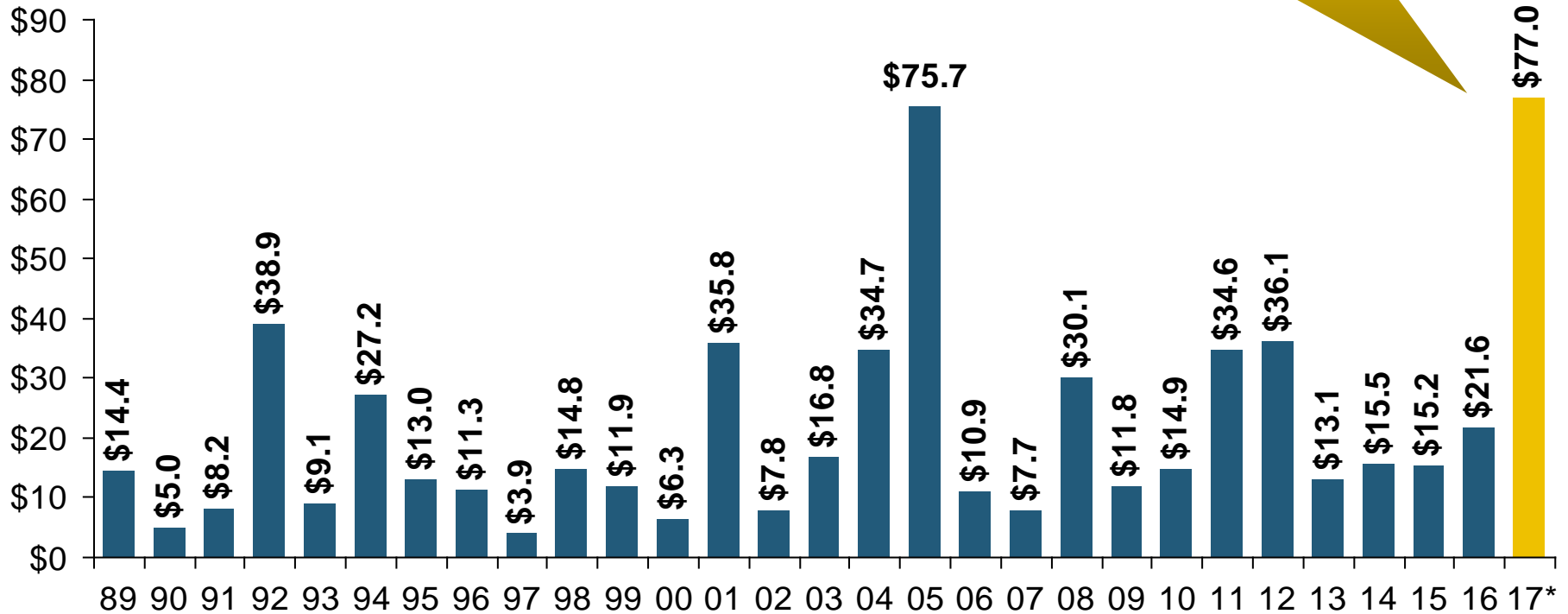
**Catastrophe Loss Update:  
*Major Driver of Rate Pressure***

**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\*

(\$ Billions, \$ 2015)



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

\*As of Dec. 31, 2017. Stated in 2017 dollars. Excludes NFIP losses.

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.)

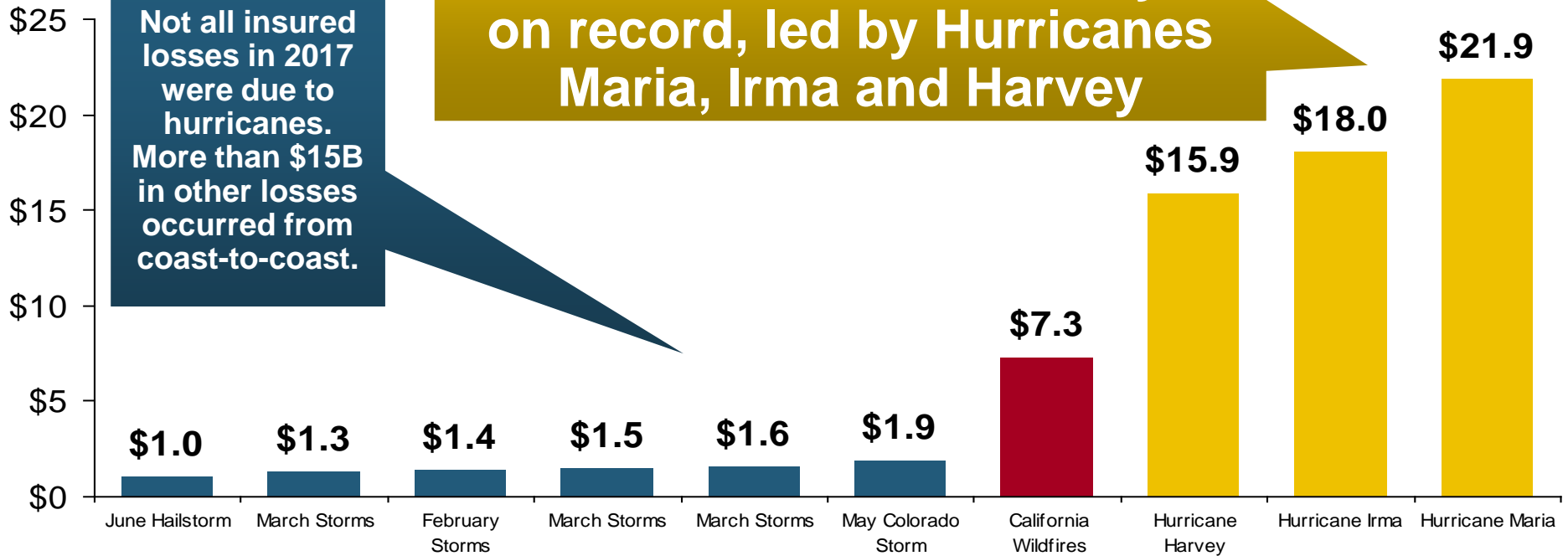
Sources: Property Claims Service/ISO; Insurance Information Institute.

# 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

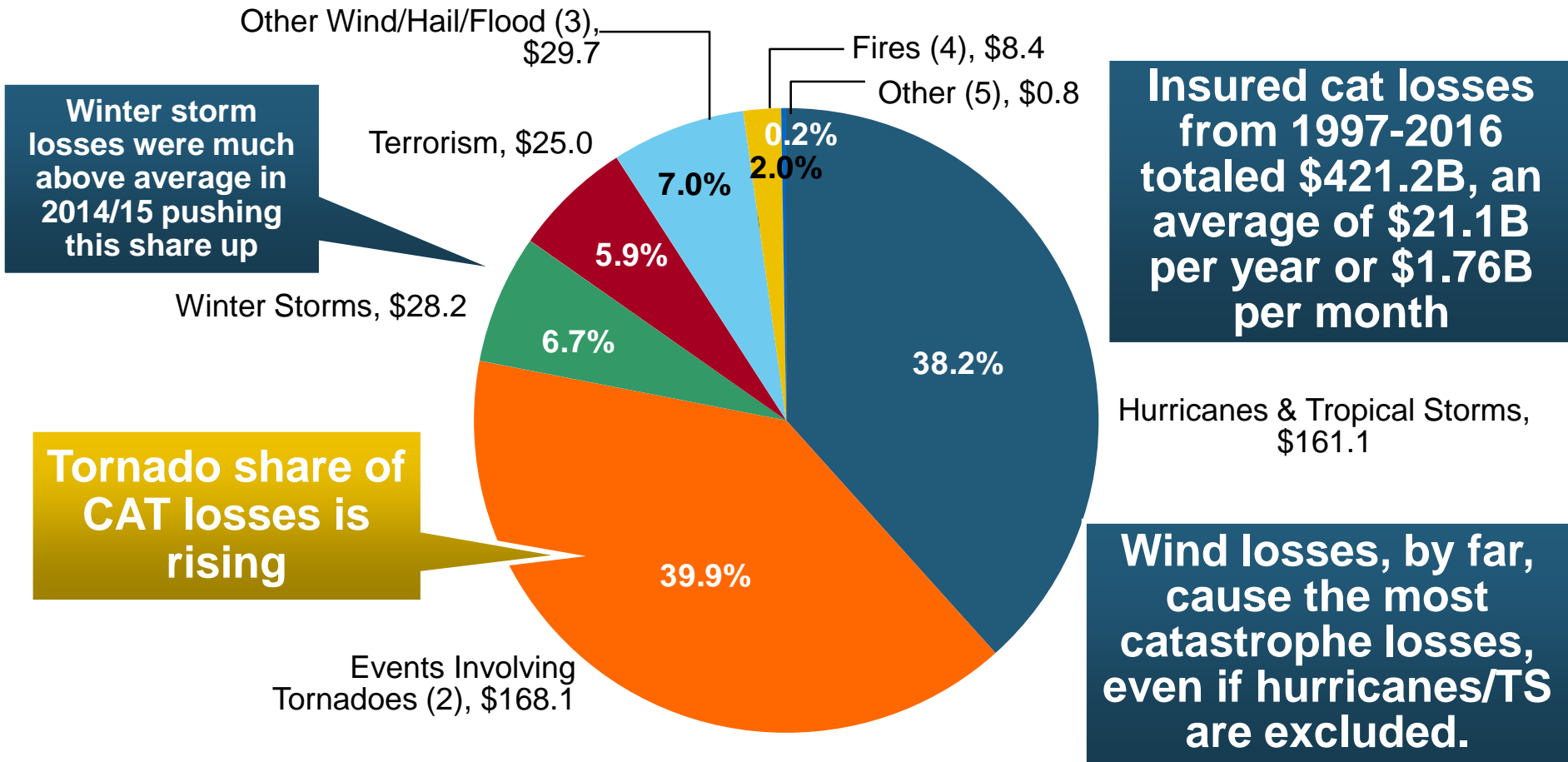
Not all insured losses in 2017 were due to hurricanes. More than \$15B in other losses occurred from coast-to-coast.



\*As of Nov. 14, 2017.

Sources: PCS; Insurance Insider: <http://www.insuranceinsider.com/-1270818/9>.

# Inflation Adjusted U.S. Catastrophe Losses by Cause of Loss, 1997–2016<sup>1</sup>



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.

# INVESTMENTS: THE NEW REALITY

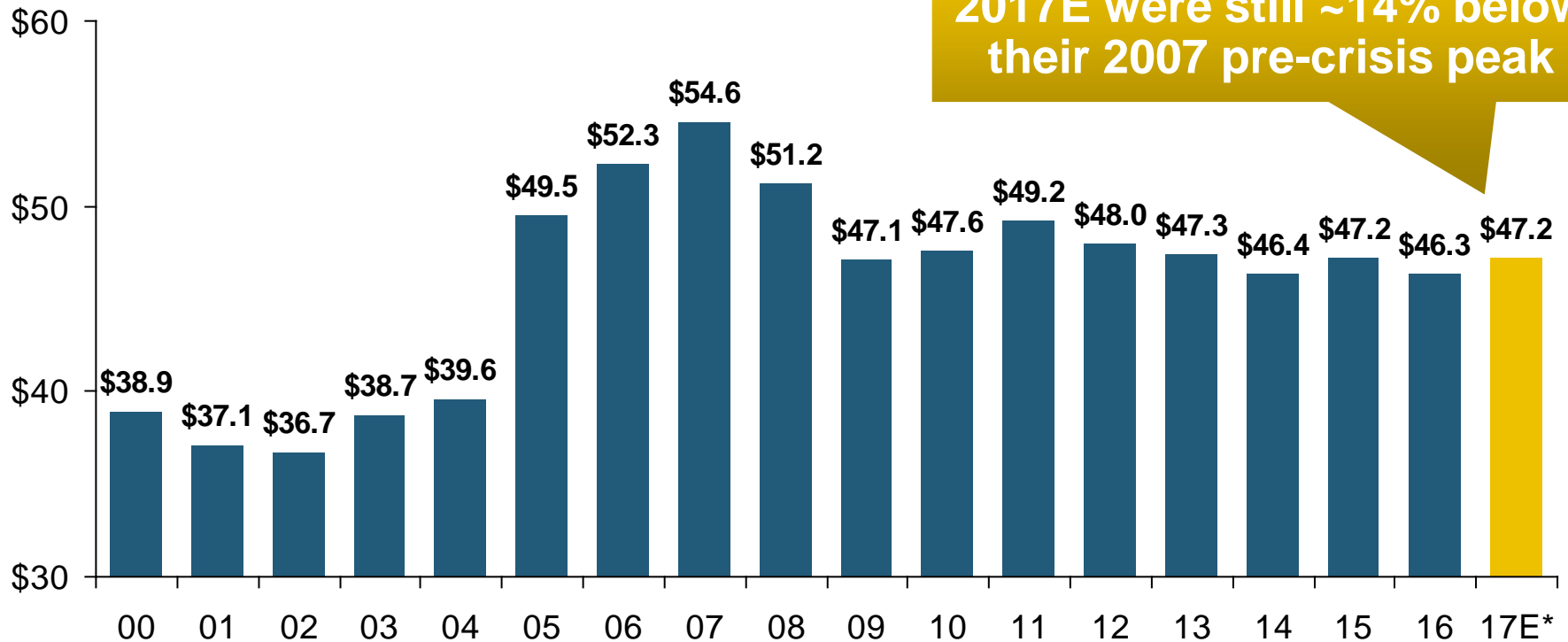
**Investment Performance is a Key  
Driver of Insurer Profitability**

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

***Will the Gains Help Insurers?***

# Property/Casualty Insurance Industry Investment Income: 2000–2017E\*

(\$ Billions)



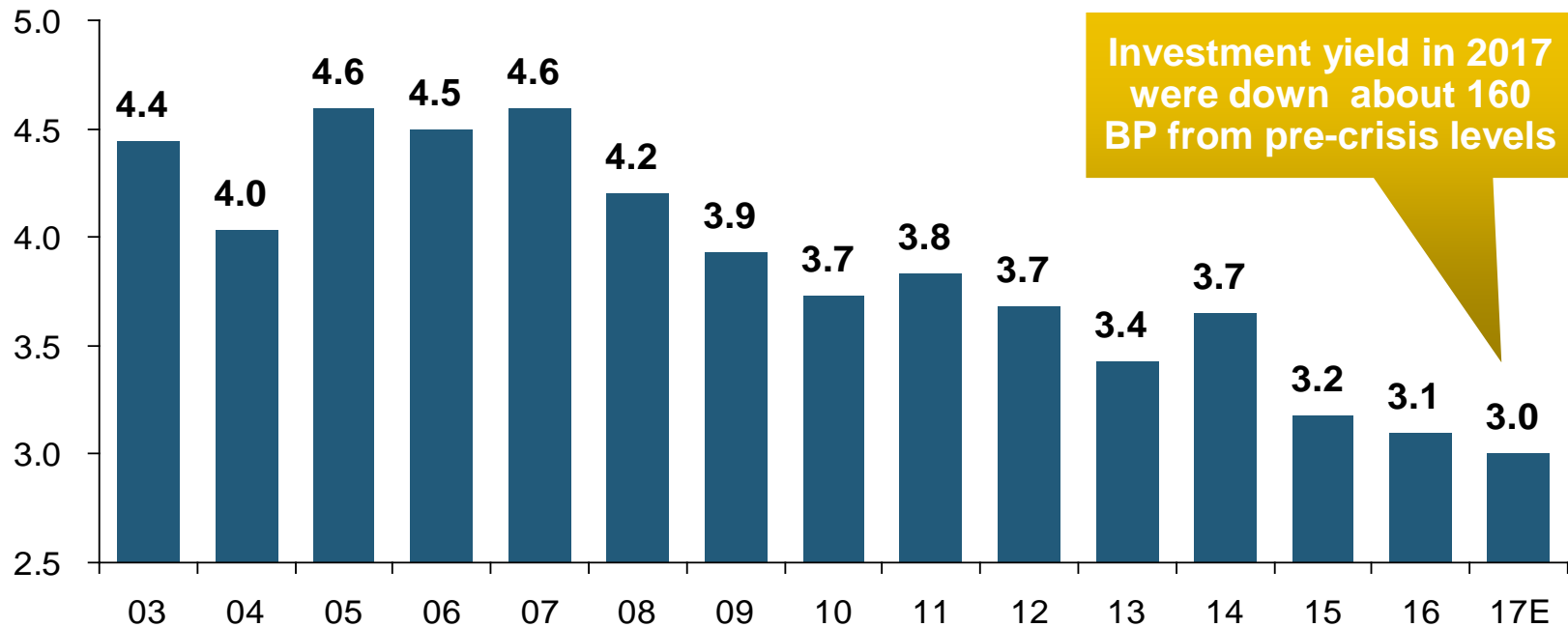
Due to persistently low interest rates, investment income fell in 2012, 2013 and 2014 but showed a small (1.7%) increase in 2015—though 2016 experienced another decline. Up ~2% in 2017.

<sup>1</sup> 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.

# Net Investment Yield on Property/ Casualty Insurance Invested Assets, 2007–2017E\*

(Percent)



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.



# **Brief P/C Insurance Growth Overview and Outlook**

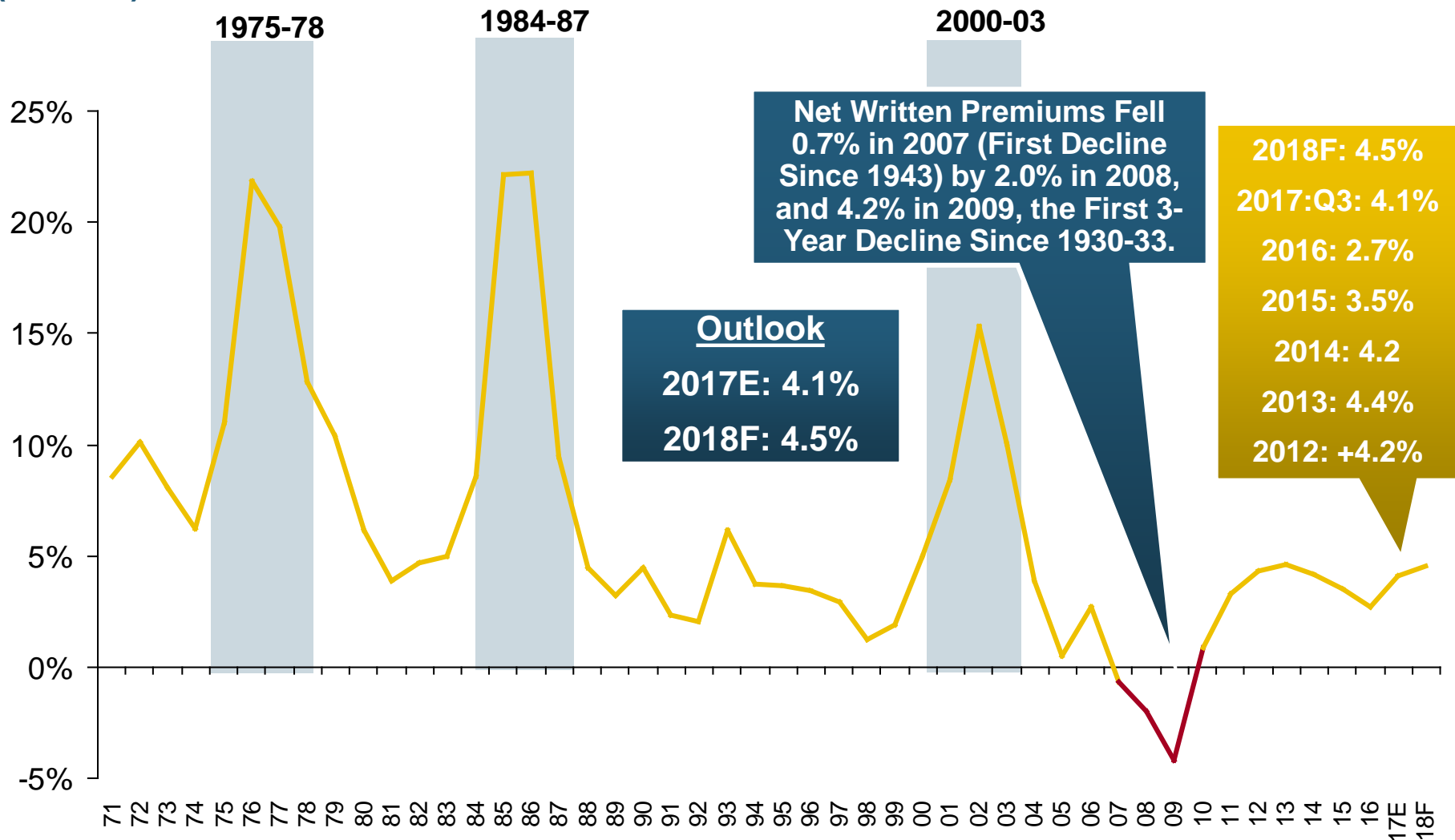
## ***Drivers of Growth in 2018***

**Economic Growth Fuels Exposure &  
Record CAT Losses Are Pressuring Rates**

***Price Competition Remains Rational While  
Others Looks Towards M&A***

# Net Premium Growth (All P/C Lines): Annual Change, 1971—2018F

(Percent)

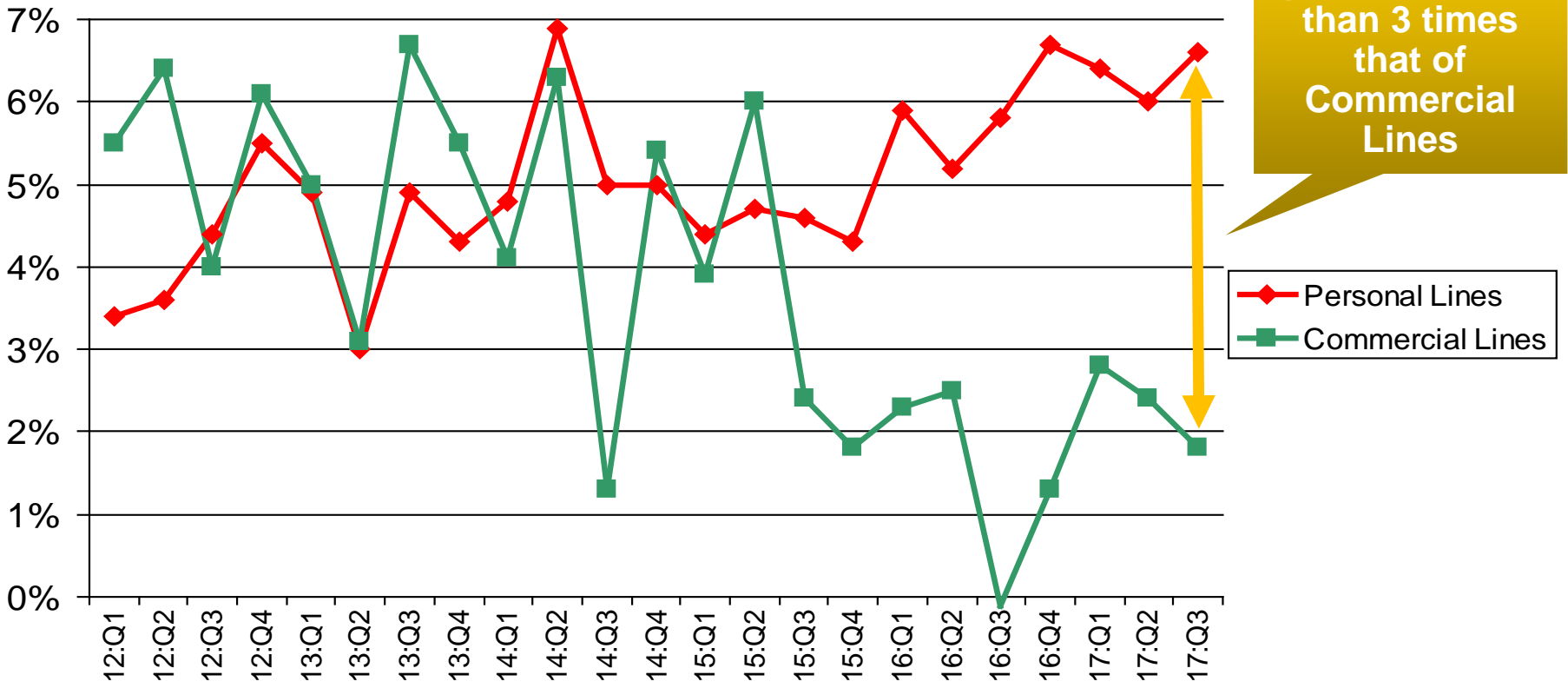


\*Q3:2017 over Q3:2016. Shaded areas denote "hard market" periods

Sources: A.M. Best (1971-2013), ISO (2014-16).

# Y-o-Y Growth Rates, Direct Premiums Written, Commercial vs. Personal Lines,

## 2012:Q4 - 2017:Q3



Personal Lines growth is more than 3 times that of Commercial Lines

◆ Personal Lines  
■ Commercial Lines

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.

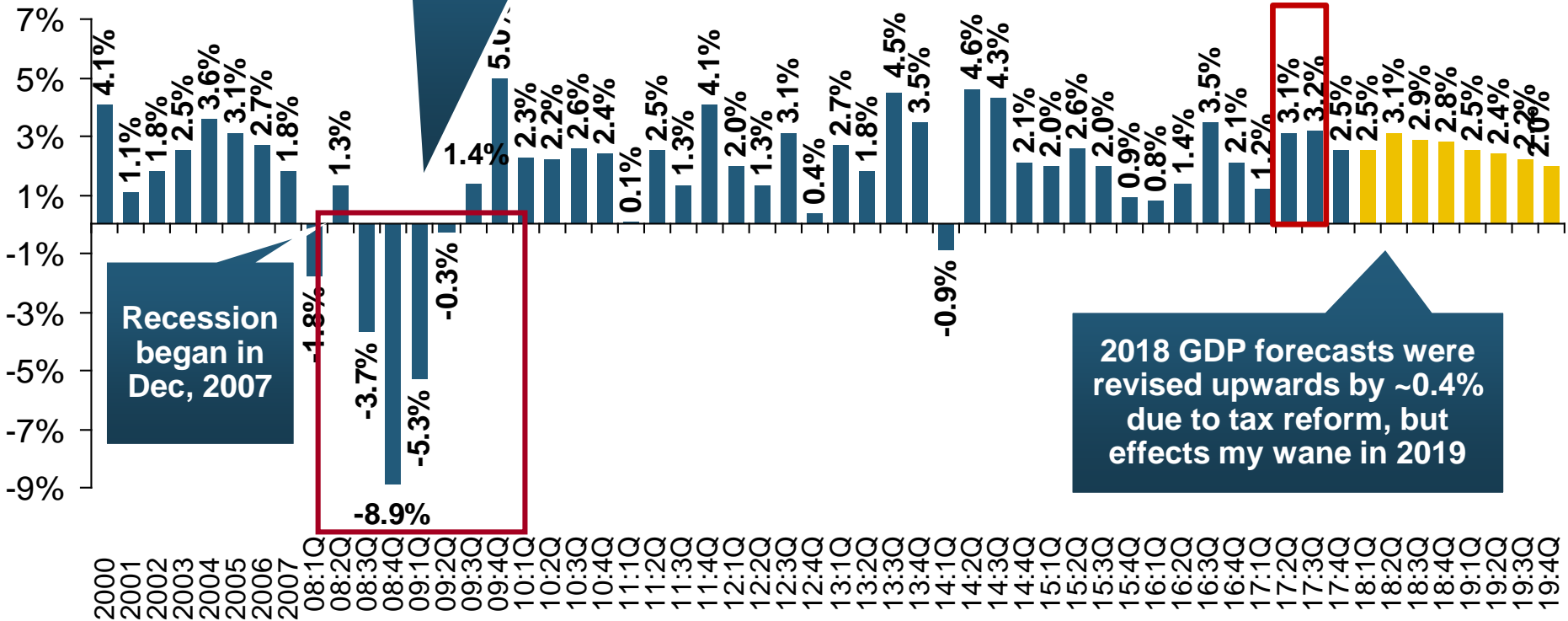
# THE ECONOMY

**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\*

Real GDP Growth (%)

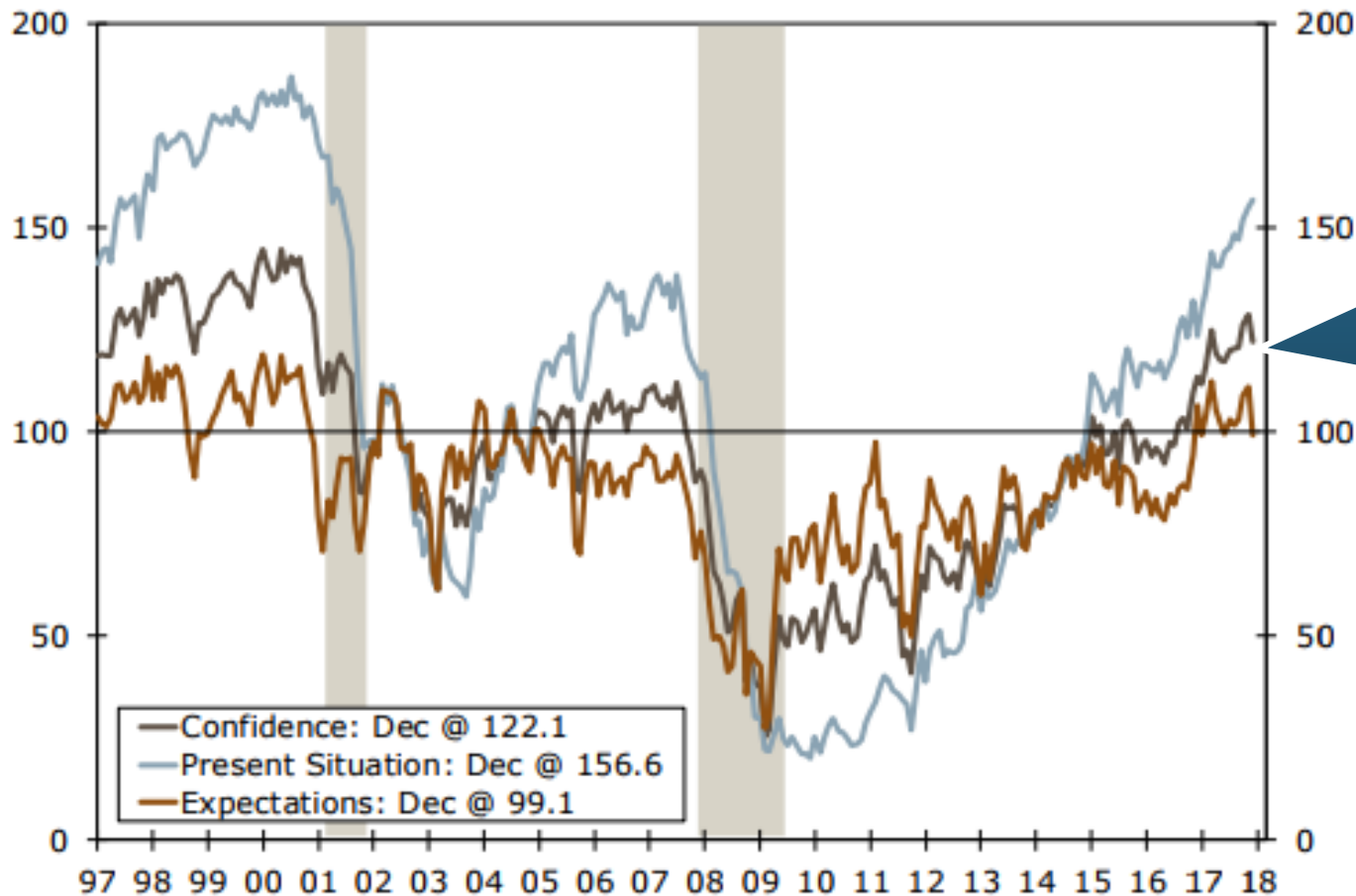


**Demand for Insurance Should Increase in 2018-19 as GDP Growth Continues at a Steady and Perhaps Accelerating Pace and Gradually Benefits the Economy Broadly**

\* Estimates/Forecasts from Blue Chip Economic Indicators.

Source: US Department of Commerce, Blue Economic Indicators 3/18; Insurance Information Institute.

# Consumer Confidence Index: Jan. 1987 – Dec. 2017

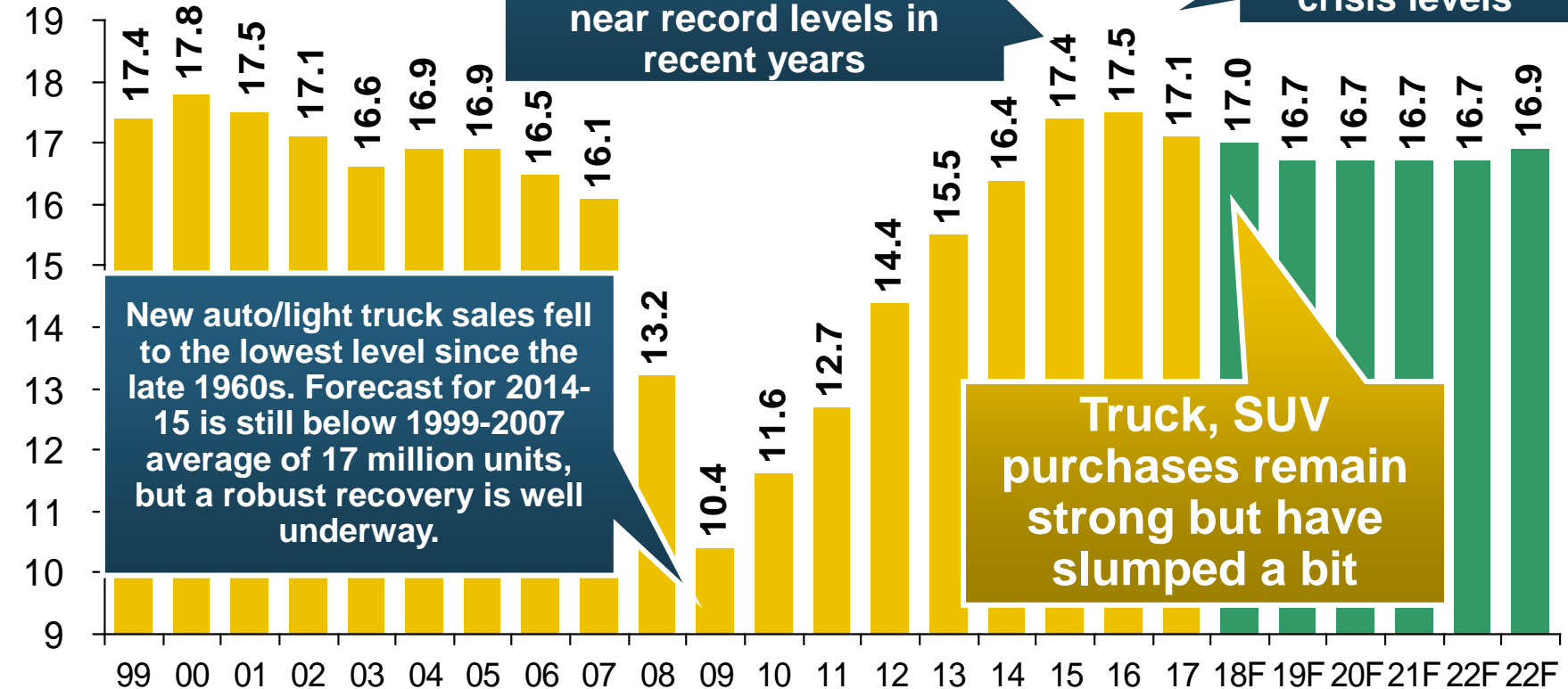


The Conference Board's Consumer Confidence Index stood at 122.1 in Dec., close to its post-recession high

**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.**

# Auto/Light Truck Sales, 1999-2023F

(Millions of Units)



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

Sales have returned to pre-crisis levels

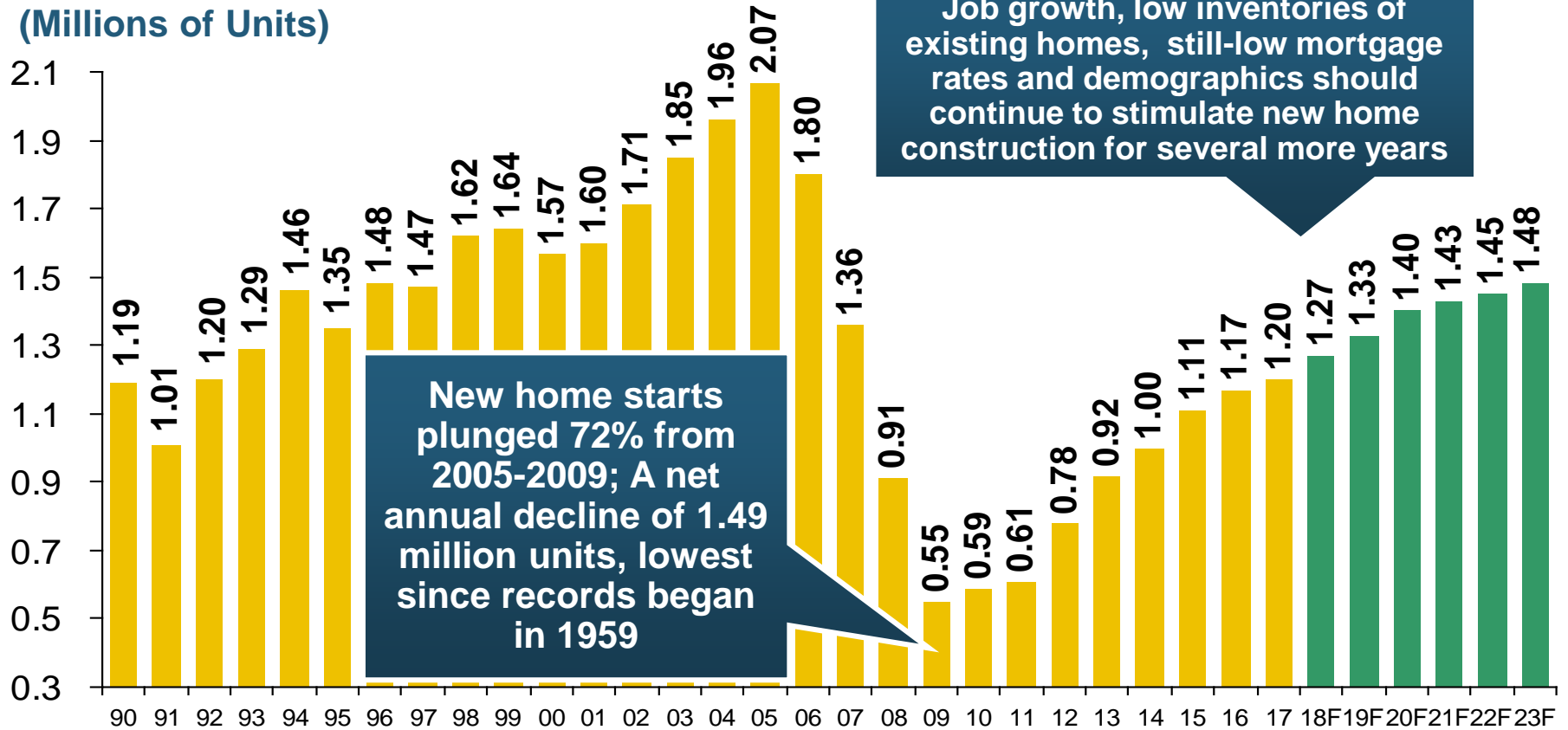
New auto/light truck sales fell to the lowest level since the late 1960s. Forecast for 2014-15 is still below 1999-2007 average of 17 million units, but a robust recovery is well underway.

Truck, SUV purchases remain strong but have slumped a bit

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%.

# New Private Housing Starts, 1990-2023F

(Millions of Units)



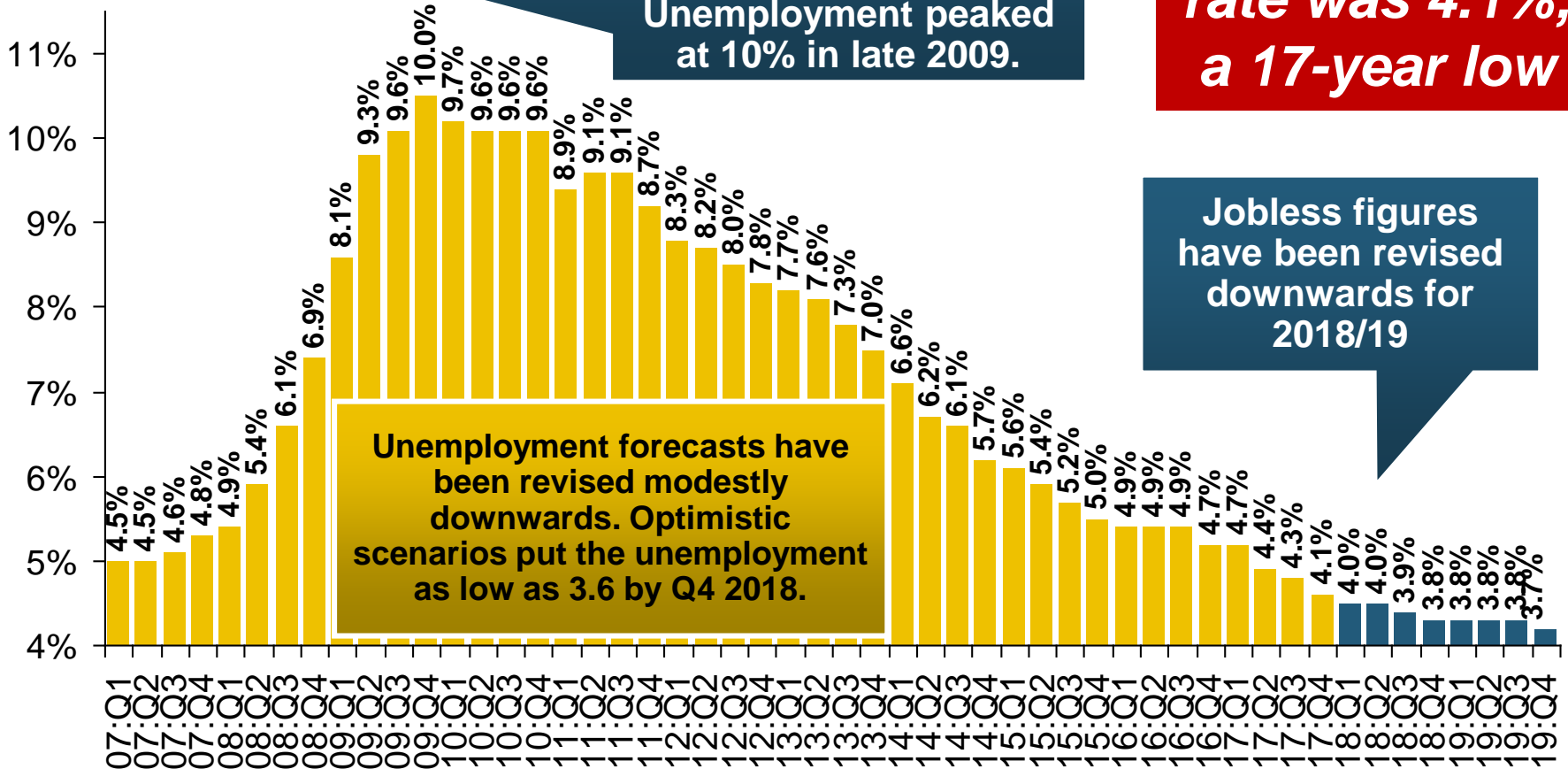
**Insurers Are Continue to See Meaningful Exposure Growth in the Wake of the “Great Recession” Associated with Home Construction: Construction Risk Exposure, Surety, Commercial Auto; Potent Driver of Workers Comp Exposure**

Source: U.S. Department of Commerce; Blue Chip Economic Indicators (1/18 for 2018-19; 10/17 for 2019-23F; Insurance Information Institute.



# US Unemployment Rate Forecast

2007:Q1 to 2019:Q4F\*



\* Yellow = actual; Blue = forecasts

Sources: US Bureau of Labor Statistics; Blue Chip Economic Indicators (1/18 edition); Insurance Information Institute.

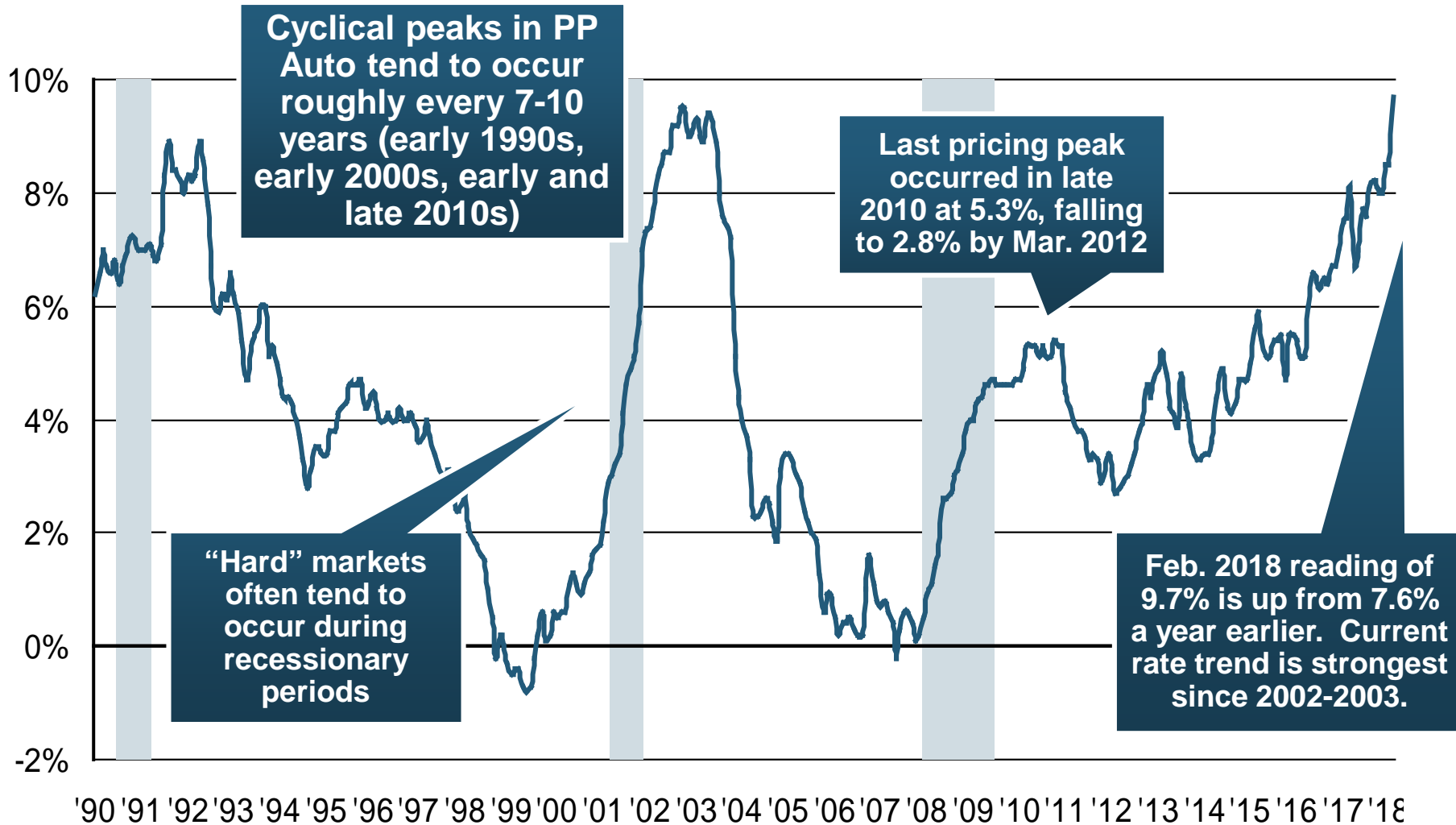
# Personal Lines Growth Drivers

**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\*



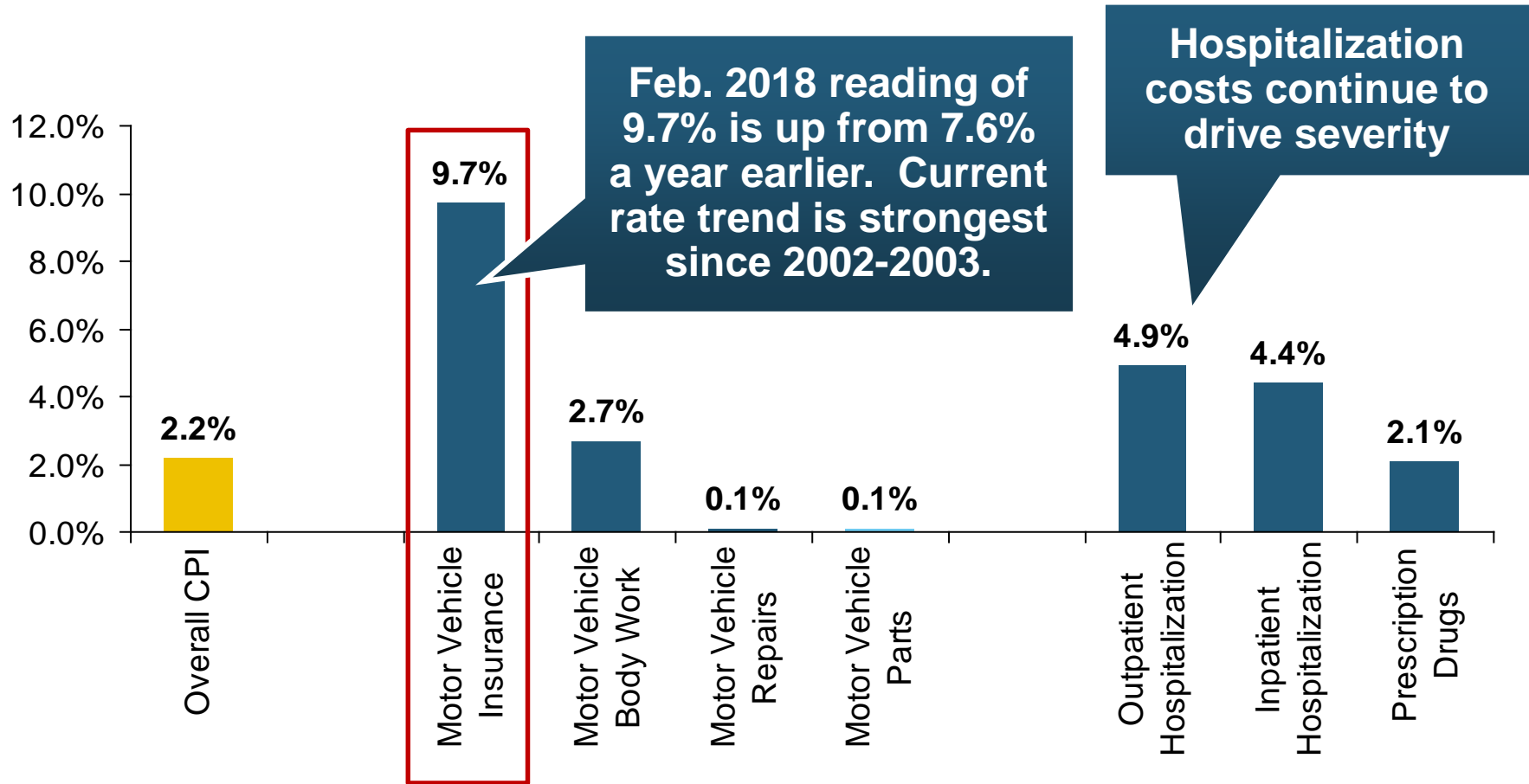
\*Percentage change from same month in prior year; through Feb. 2018; seasonally adjusted

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 (%)

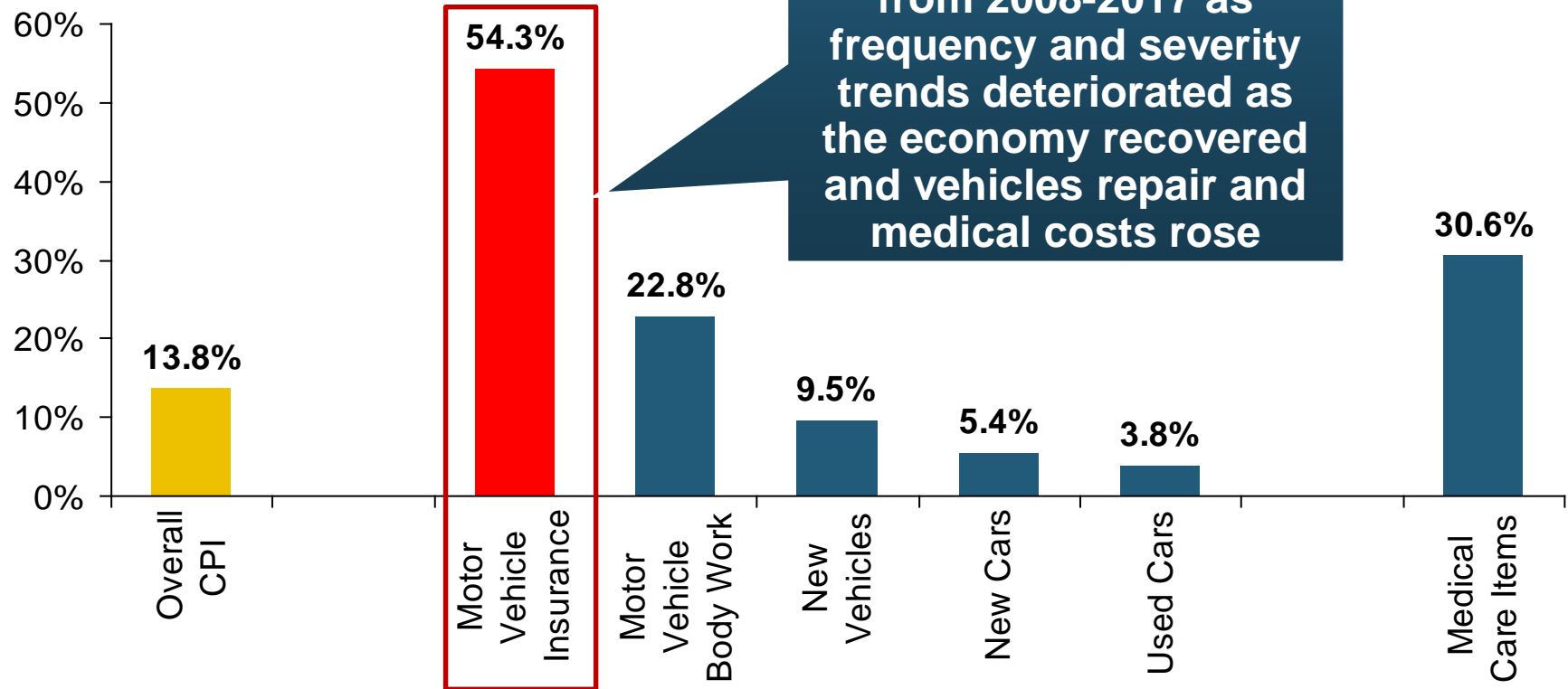


\* February 2018 vs. February 2017.

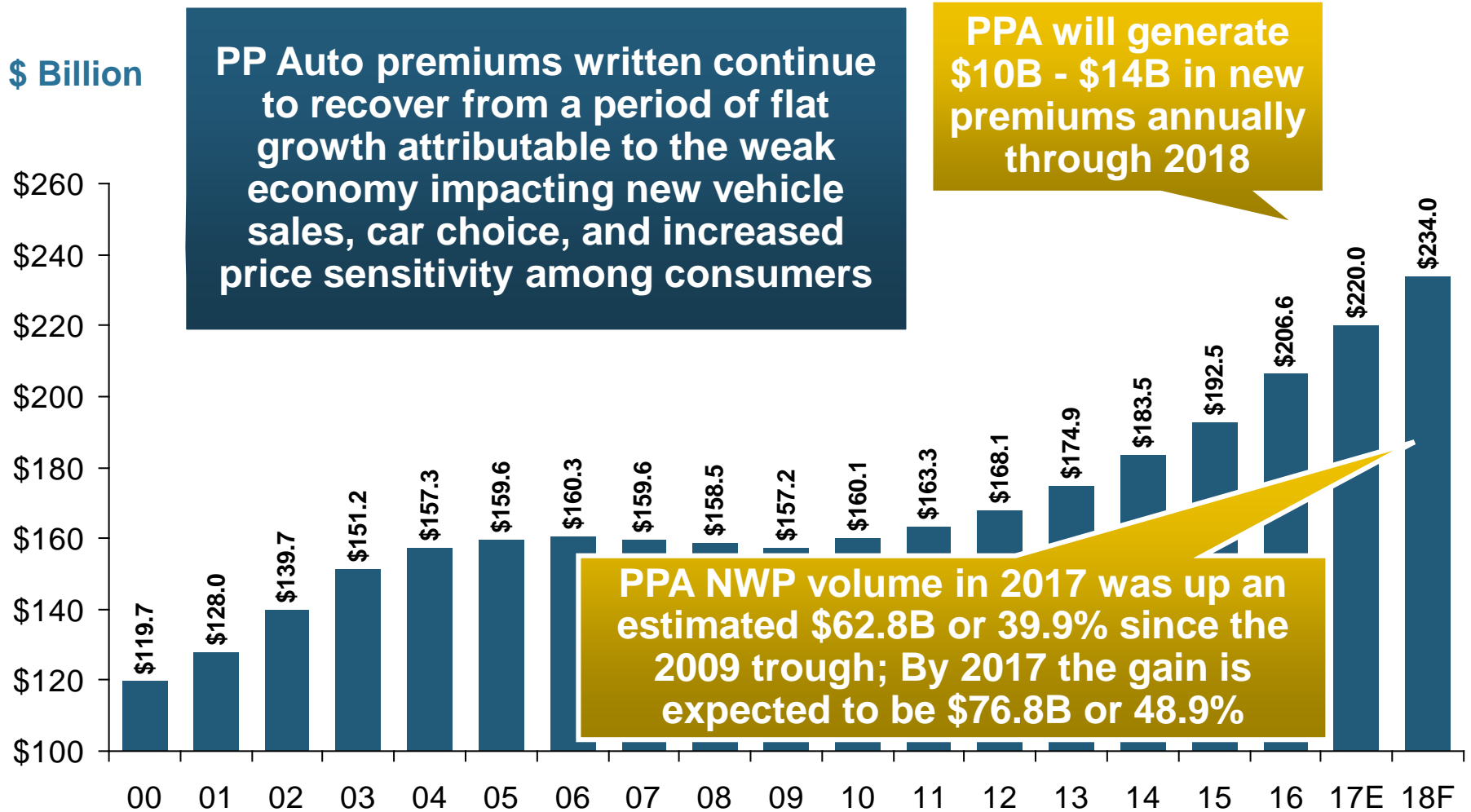
Source: US Bureau of Labor Statistics; USC Center for Risk and Uncertainty Management.

# Personal Auto Insurance: Key CPI Cost Component Changes: 2008 – 2017

Percentage Change (%)



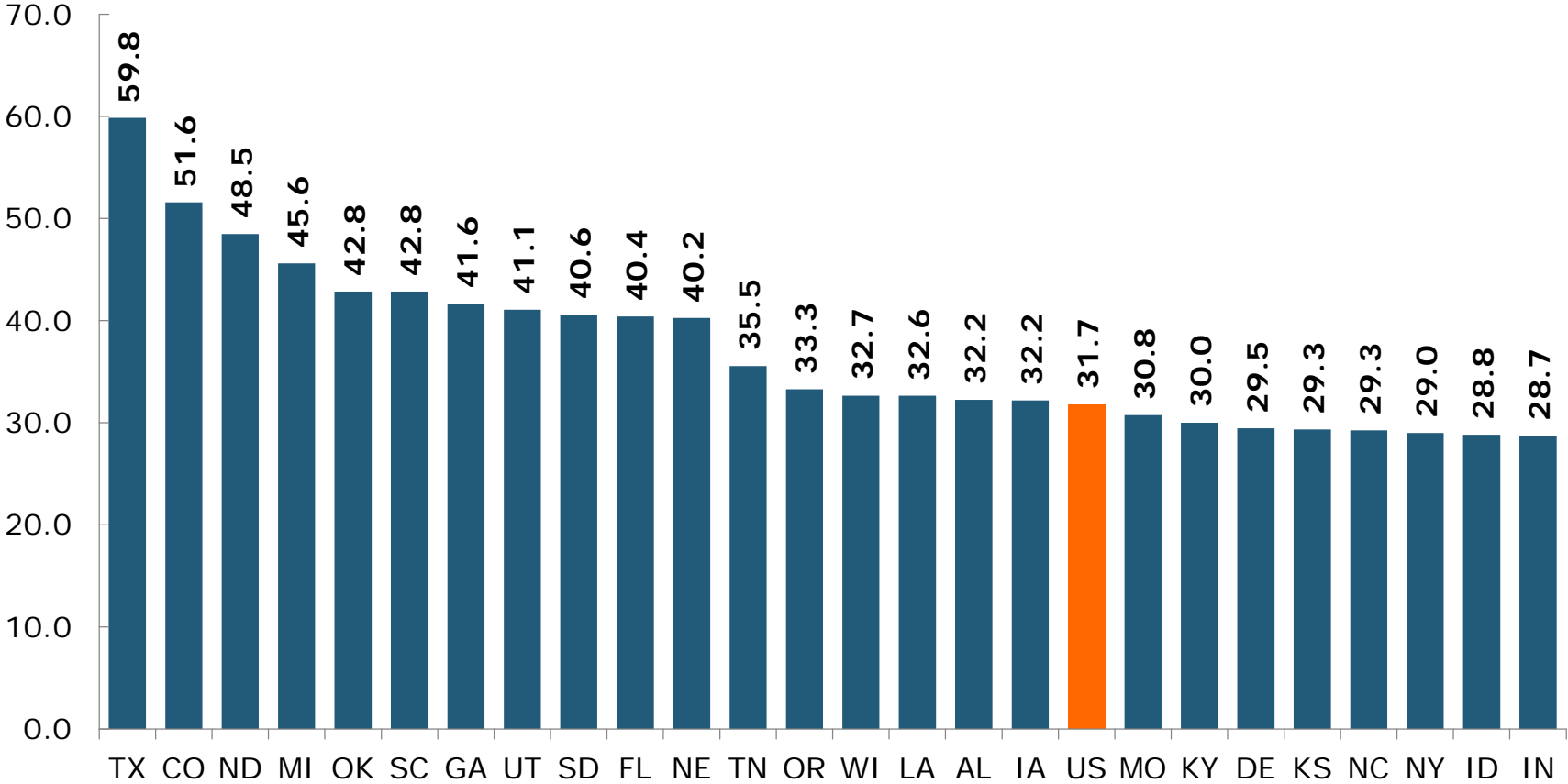
# Private Passenger Auto Insurance Net Written Premium, 2000–2018F



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

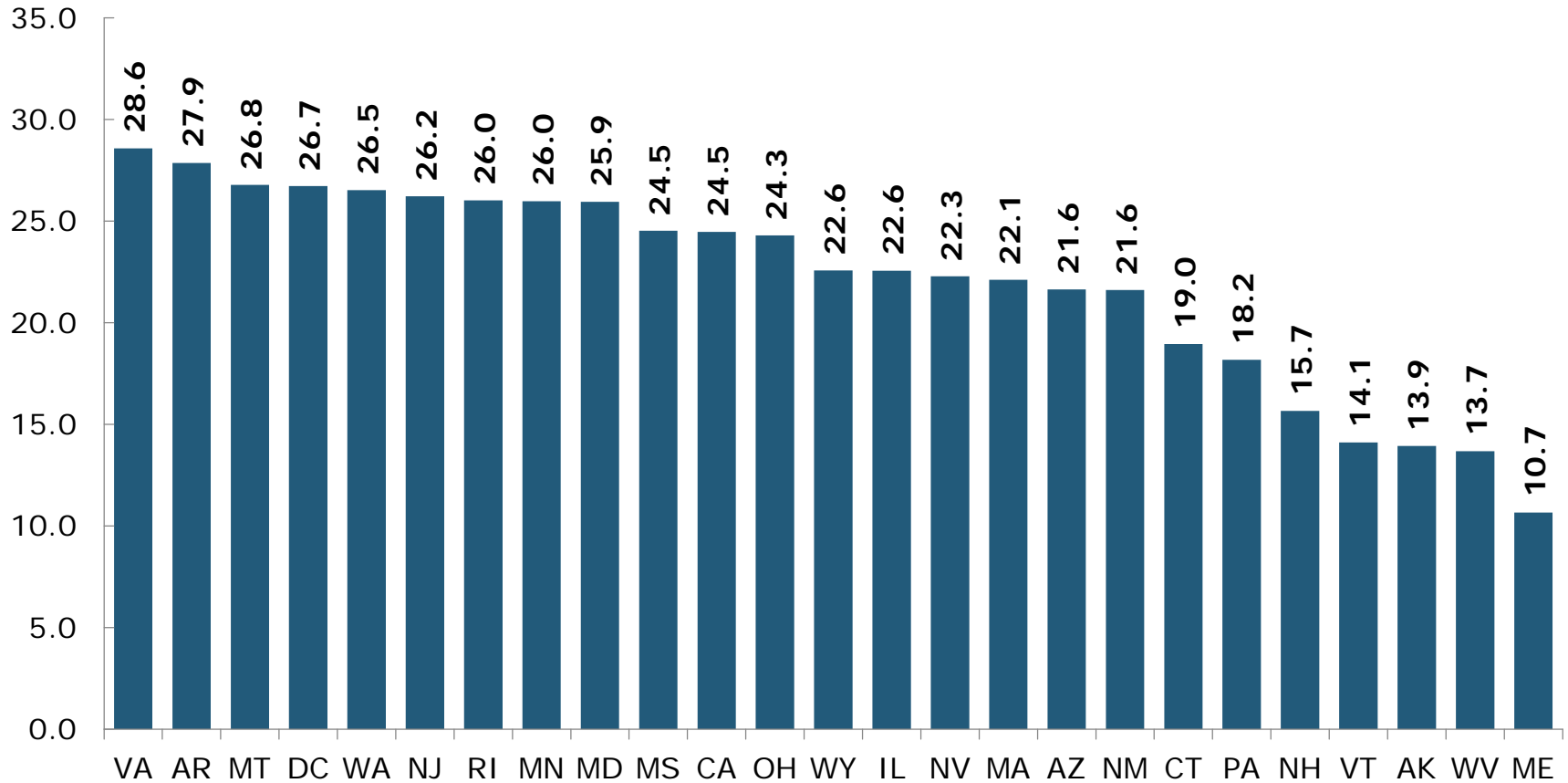


Source: NAIC data, sourced from S&P Global Market Intelligence, Insurance Information Institute.



# Direct Premiums Written: Pvt. Passenger Auto Percent Change by State, 2007-2016

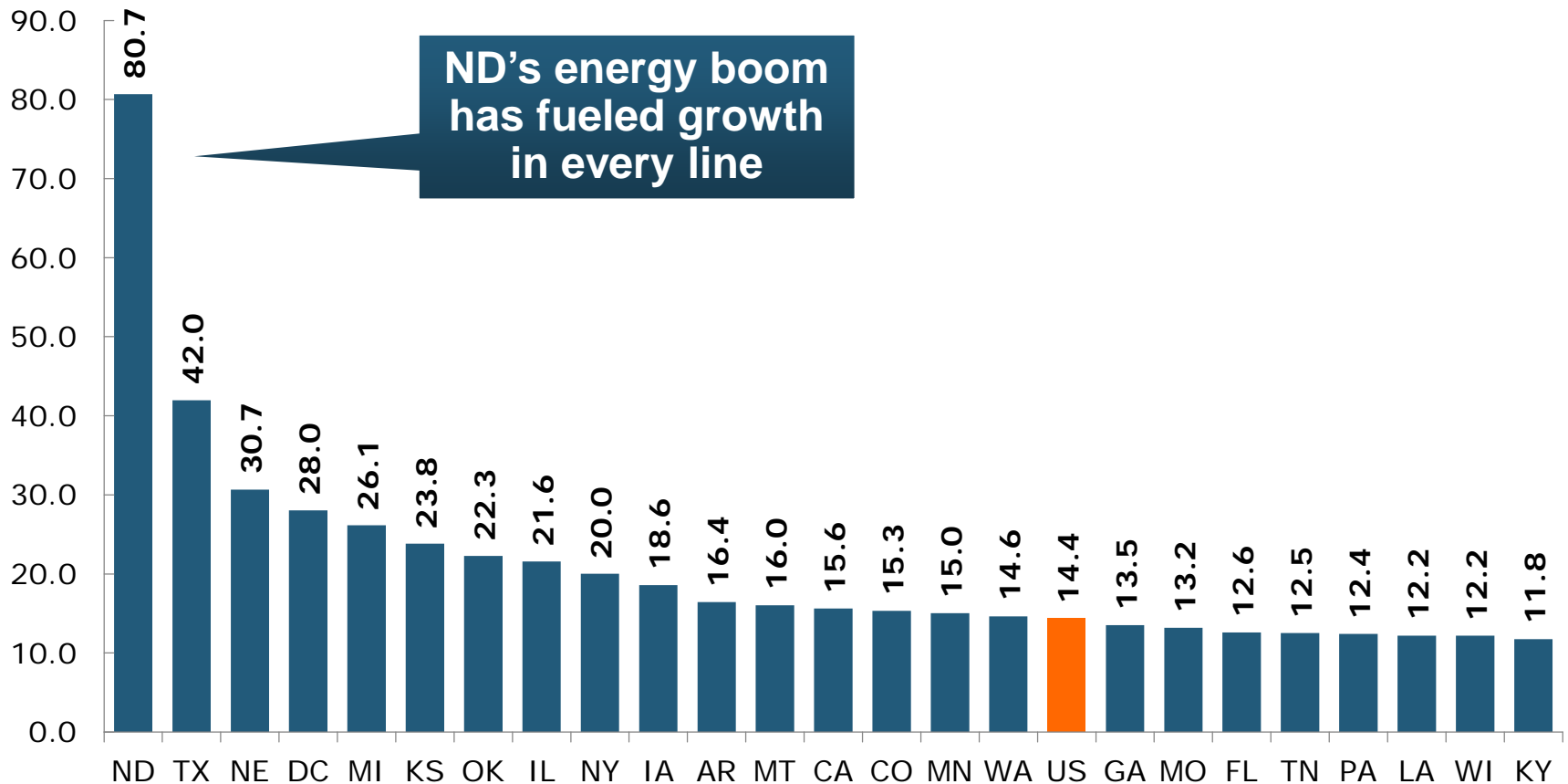
## Bottom 25 States



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

# Direct Premiums Written: *Commercial* Auto Percent Change by State, 2007-2016

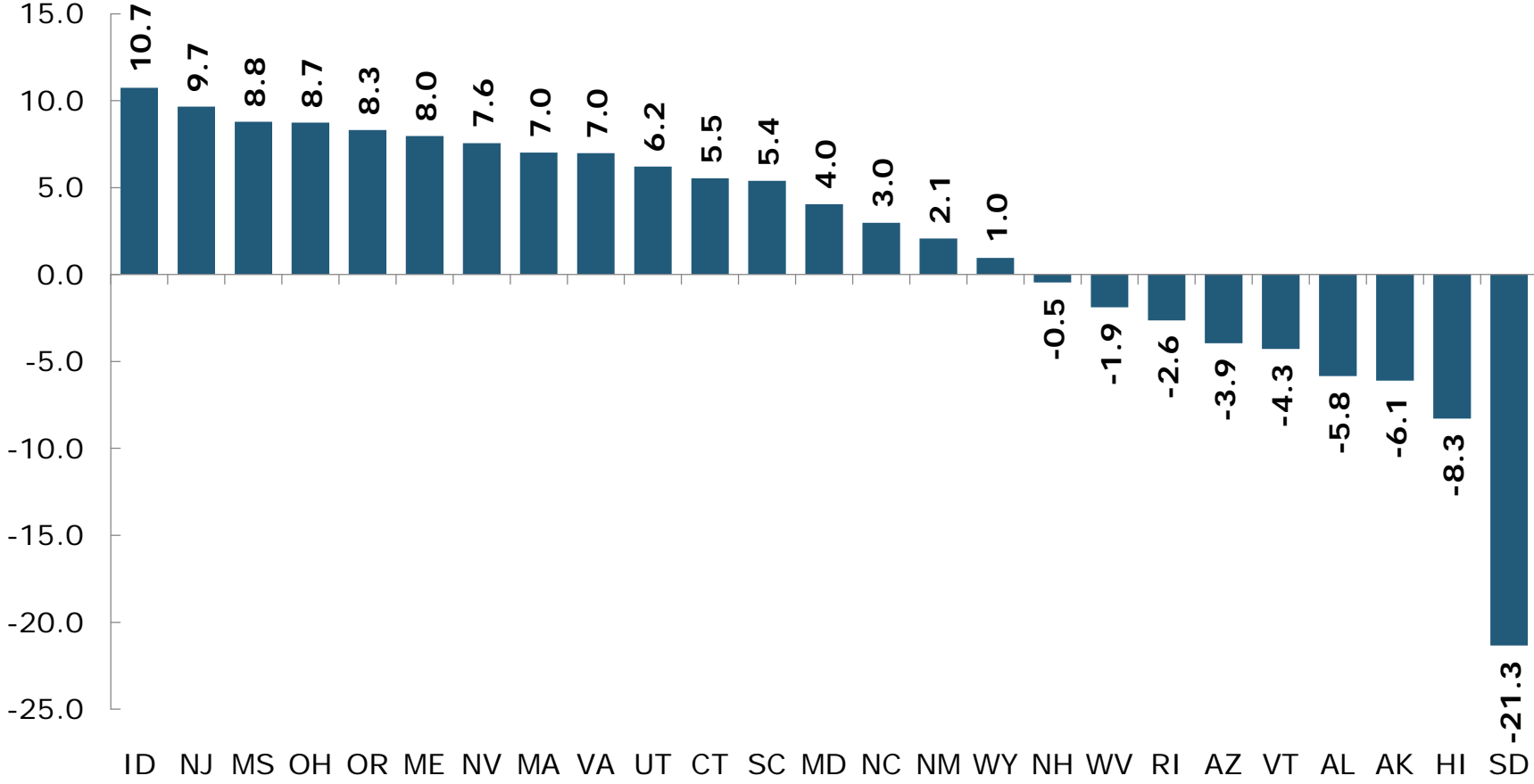
## Top 25 States



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

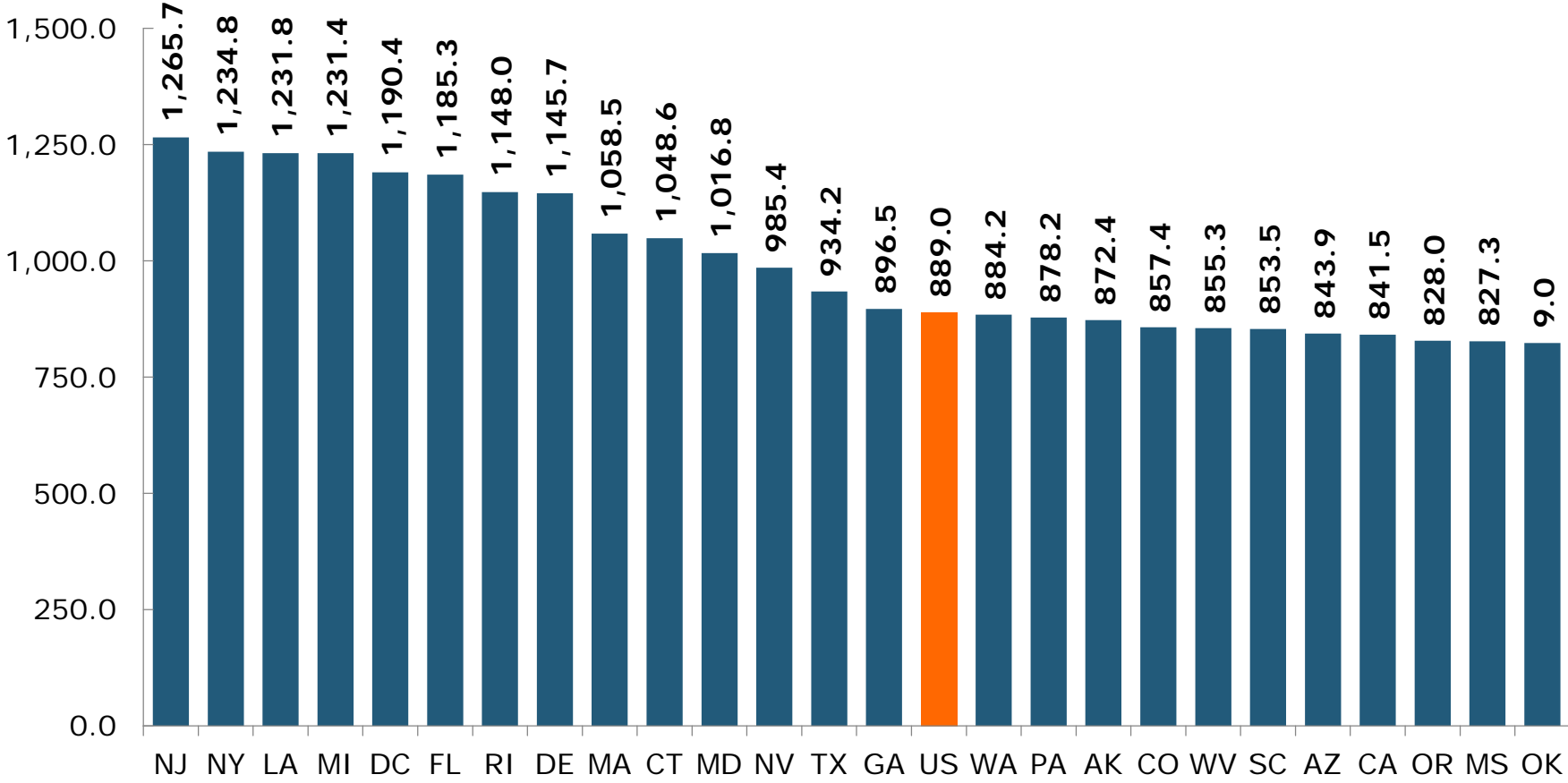
# Direct Premiums Written: *Commercial* Auto Percent Change by State, 2007-2016

## Bottom 25 States



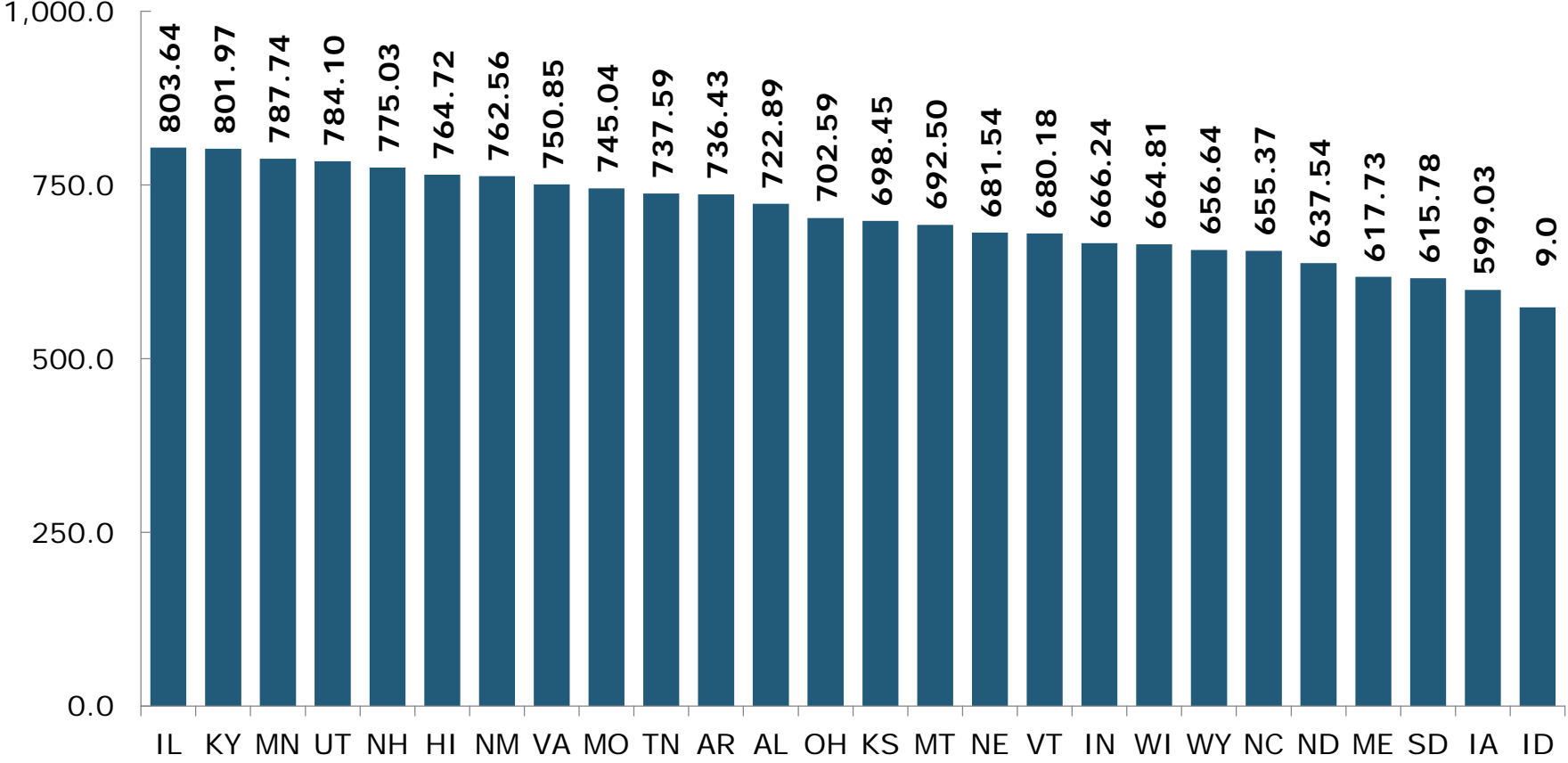
Source: NAIC data, sourced from S&P Global Market Intelligence, Insurance Information Institute.

# Auto Average Expenditure 2015: Highest 25 States



Sources: NAIC via SNL Financial; Insurance Information Institute.

# Auto Average Expenditure 2015: Lowest 25 States

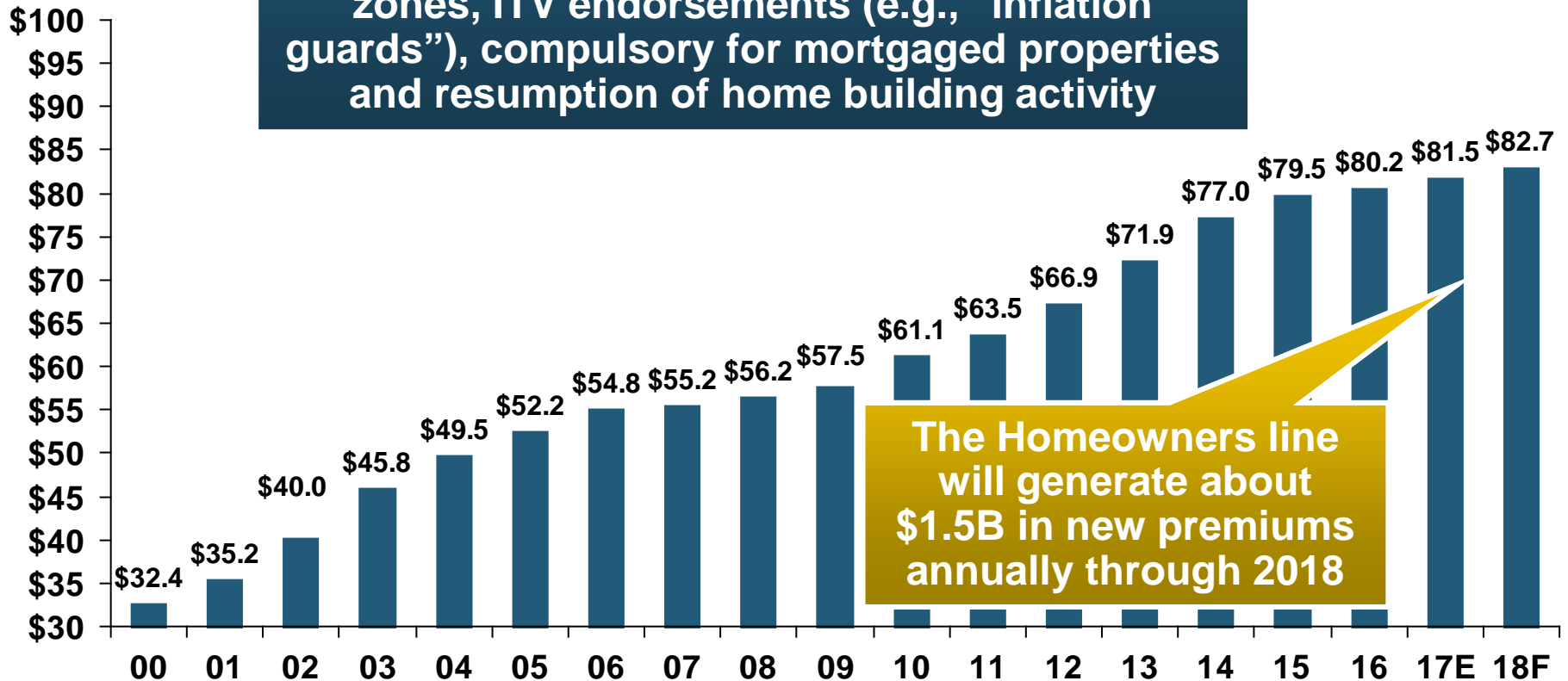


Sources: NAIC via SNL Financial; Insurance Information Institute.

# Homeowners Insurance Net Written Premium, 2000–2018F

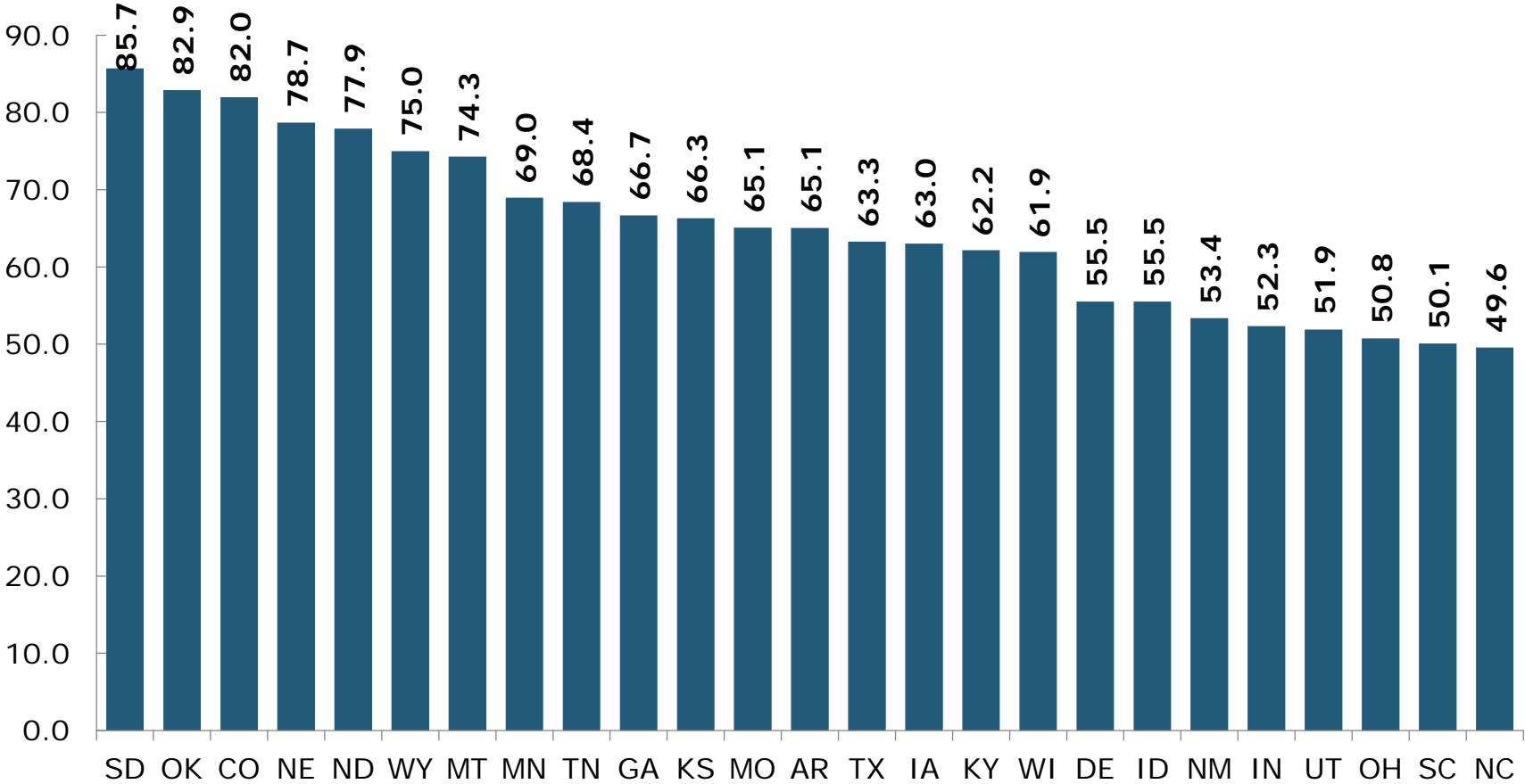
\$ Billions

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



# Direct Premiums Written: Homeowners MP Percent Change by State, 2007-2016

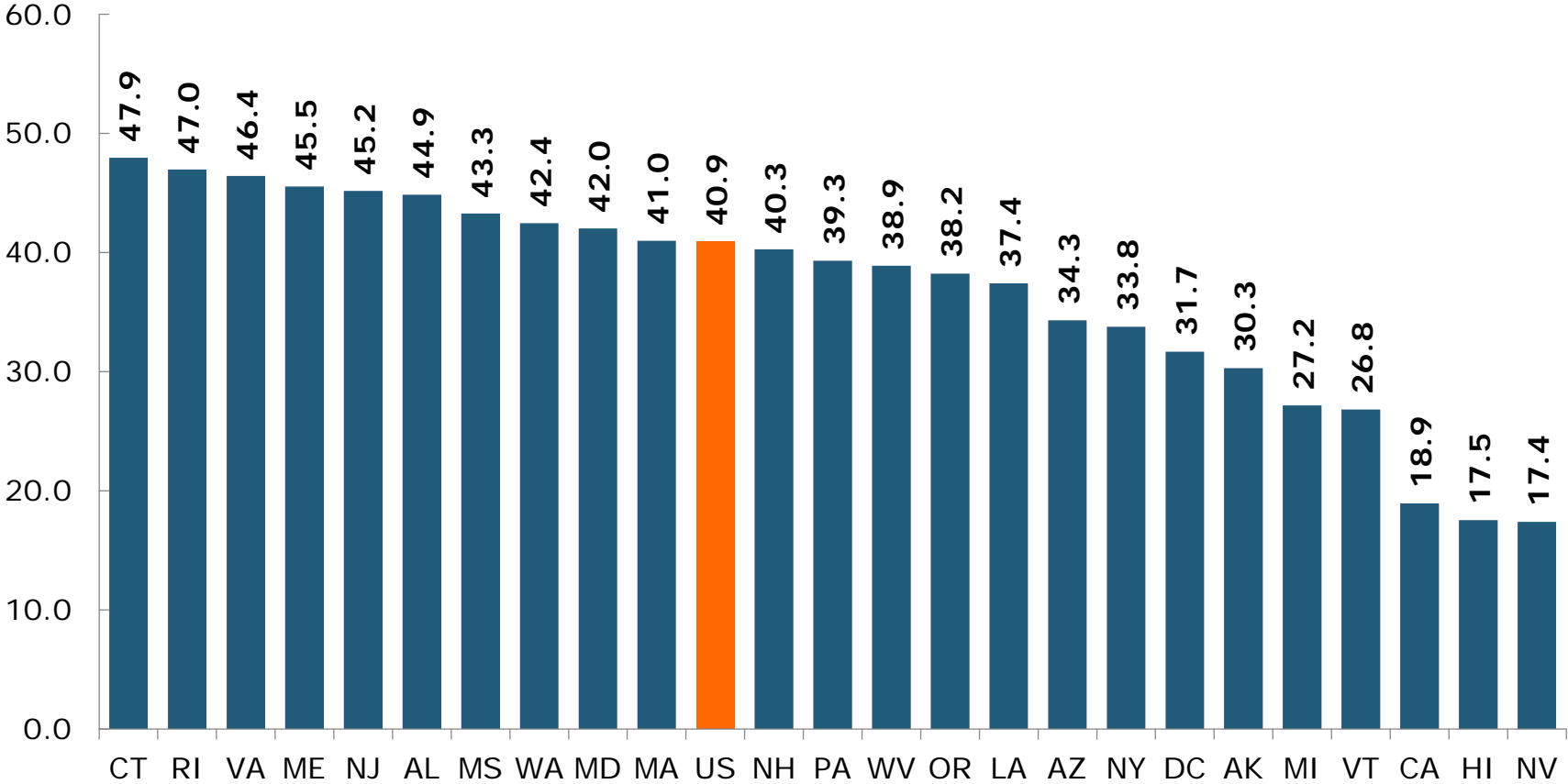
## Top 25 States



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**

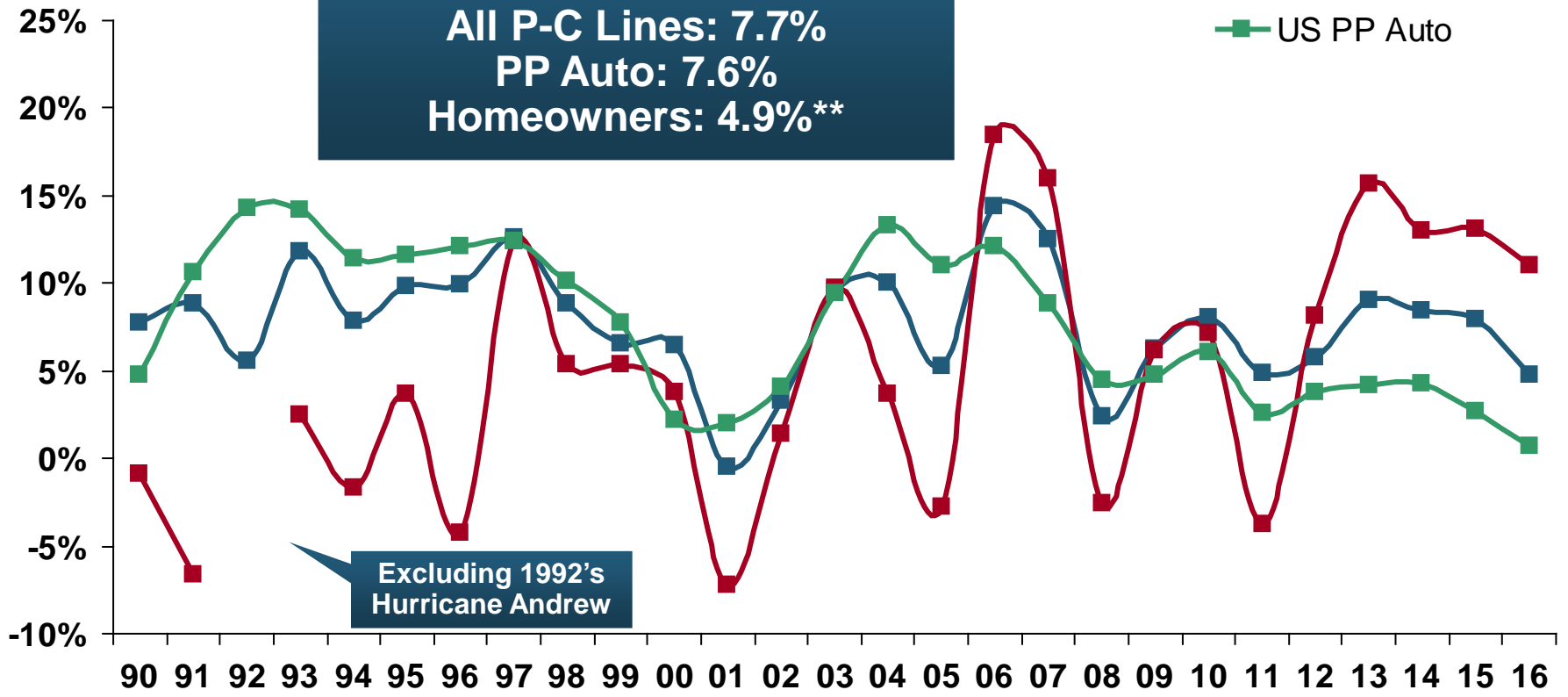
***Homeowners Majorly Impacted by CATs in 2017***

# Return on Net Worth: All P-C Lines vs. Homeowners & Pvt. Pass. Auto, 1990-2016\*

(Percent)

Average RNW: 1990-2016\*  
 All P-C Lines: 7.7%  
 PP Auto: 7.6%  
 Homeowners: 4.9%\*\*

- US All Lines
- US Home
- US PP Auto



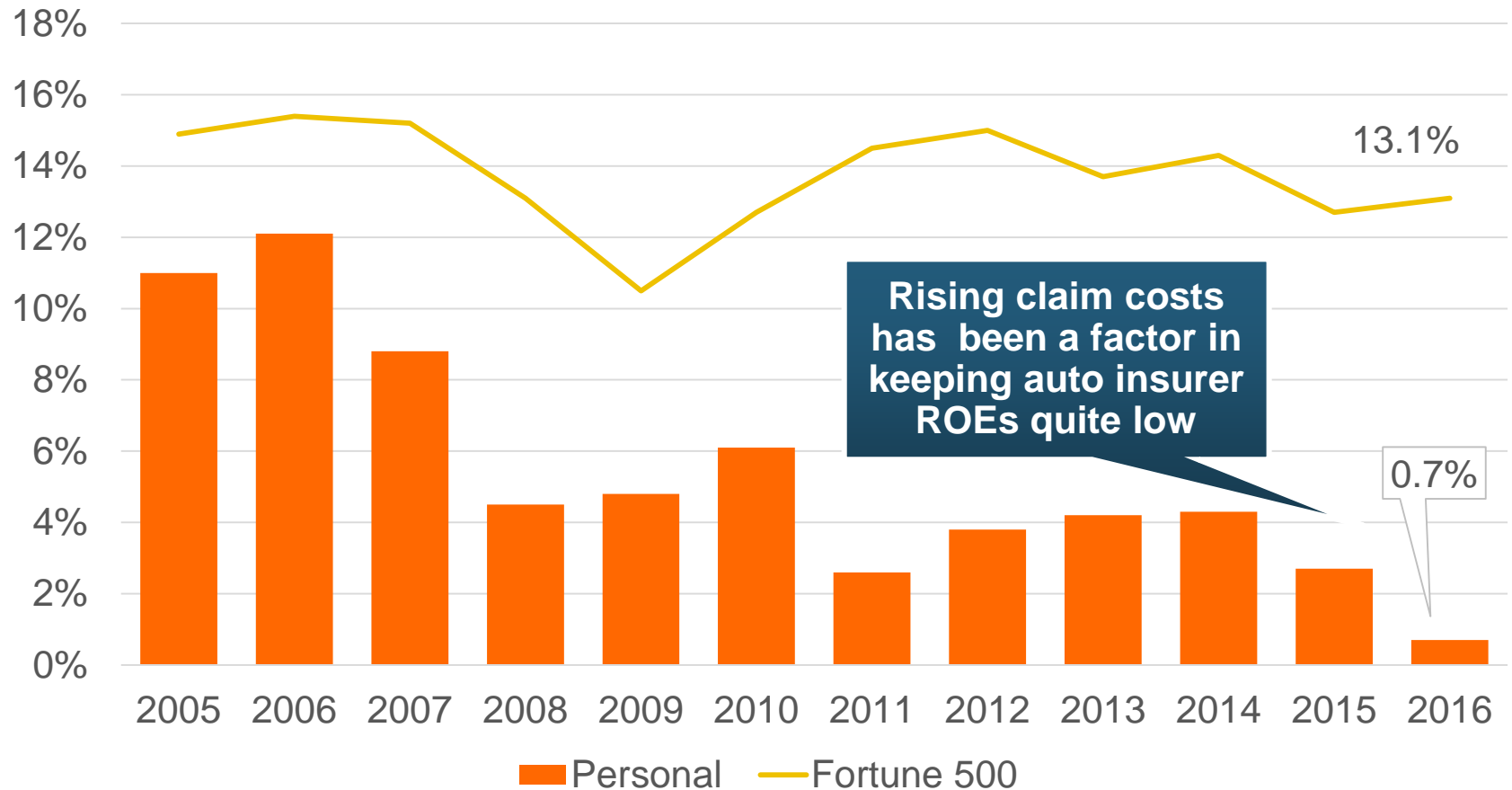
**Homeowners is Now Outperforming Pvt.Pass. Auto and P-C Industry as a Whole. HO Volatility is Associated Primarily With Coastal Exposure Issues**

\*Latest available.

\*\*Excludes 1992, the year of Hurricane Andrew. If 1992 is included the resulting homeowners RNW is 2.2%

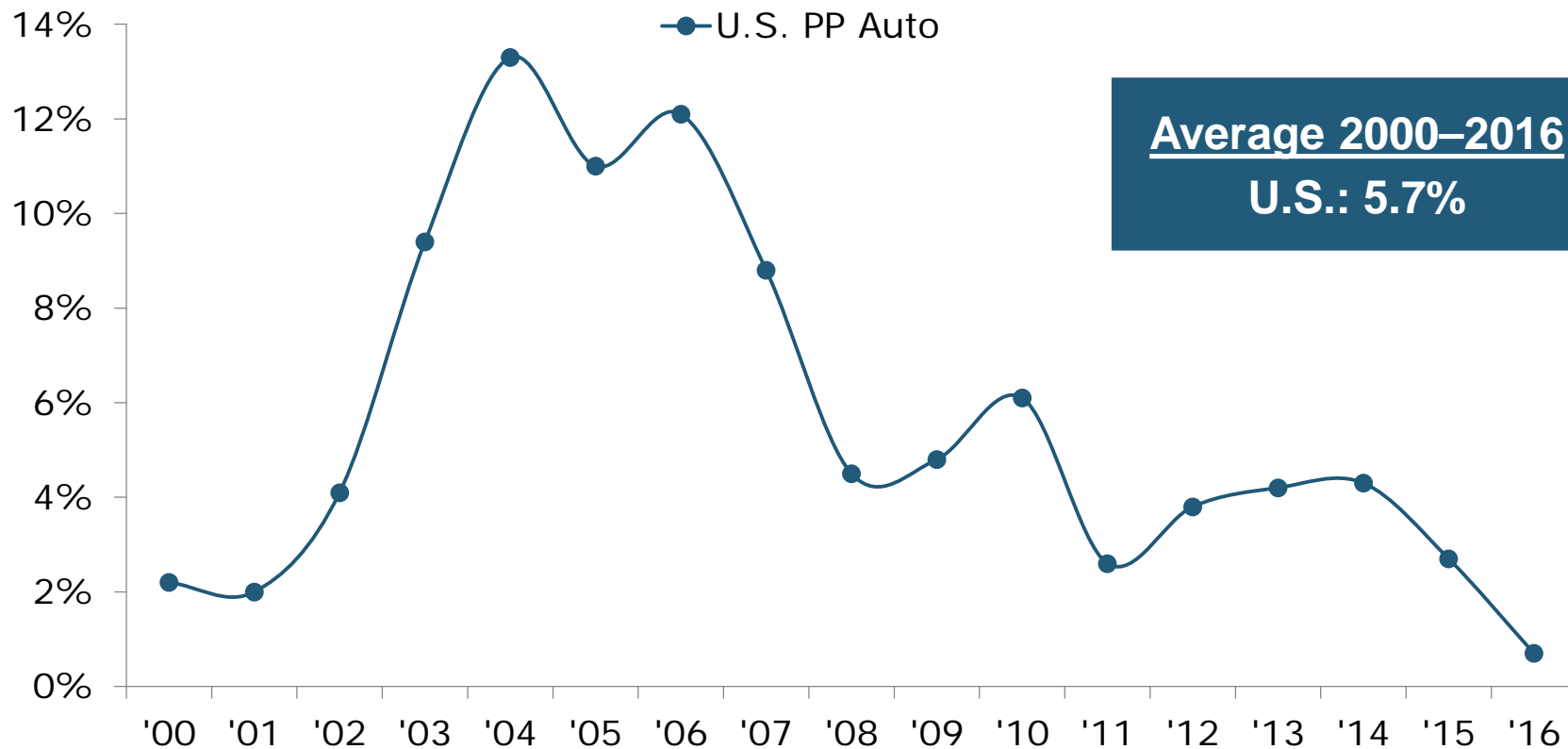
Sources: NAIC; Insurance Information Institute.

# Return on Net Worth: US Personal Auto, 2005-2016

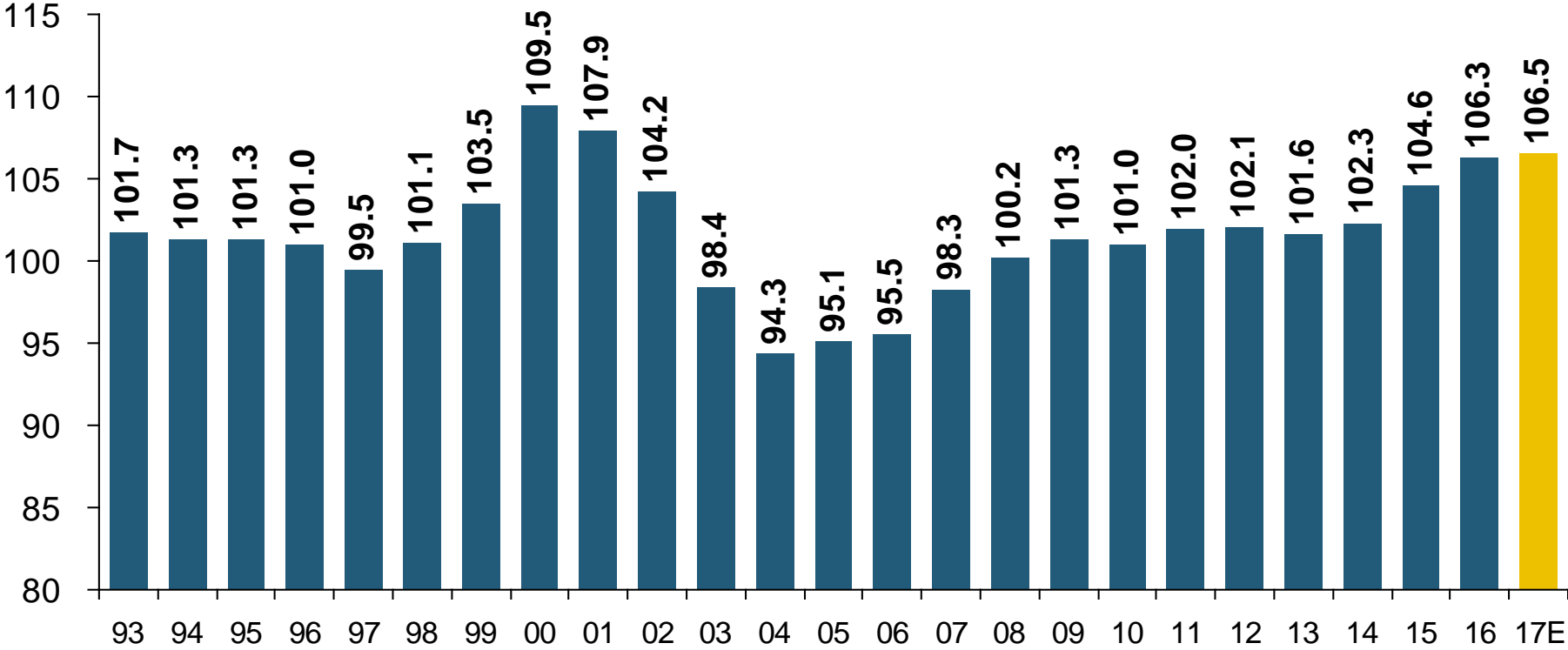


**Auto Insurance Profitability Remains Well Below Pre-Crisis Levels (12% vs. ~1%) and Far Below the Fortune 500 (13% vs. ~1%)**

# Return on Net Worth for Private Passenger Auto Insurance: U.S., 2000–2016



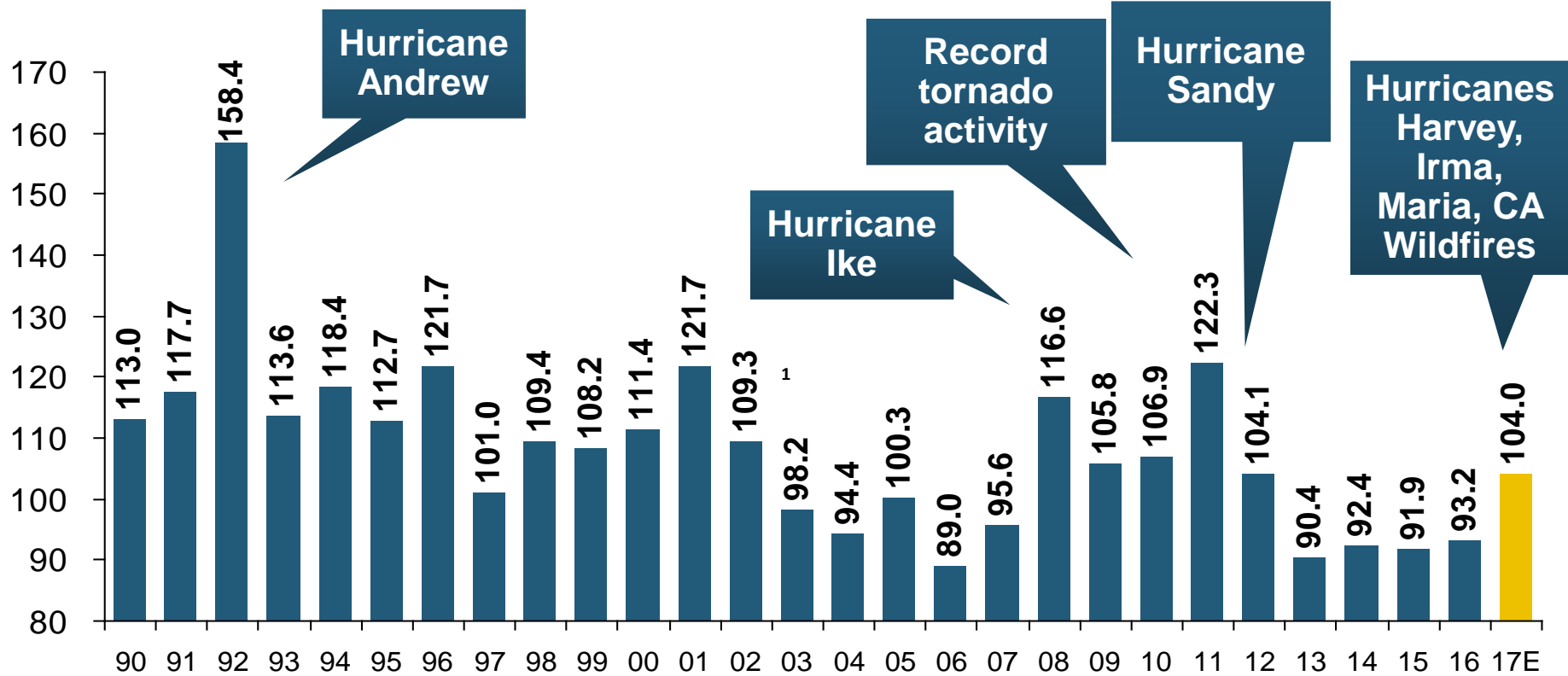
# Private Passenger Auto Combined Ratio: 1993–2017E



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

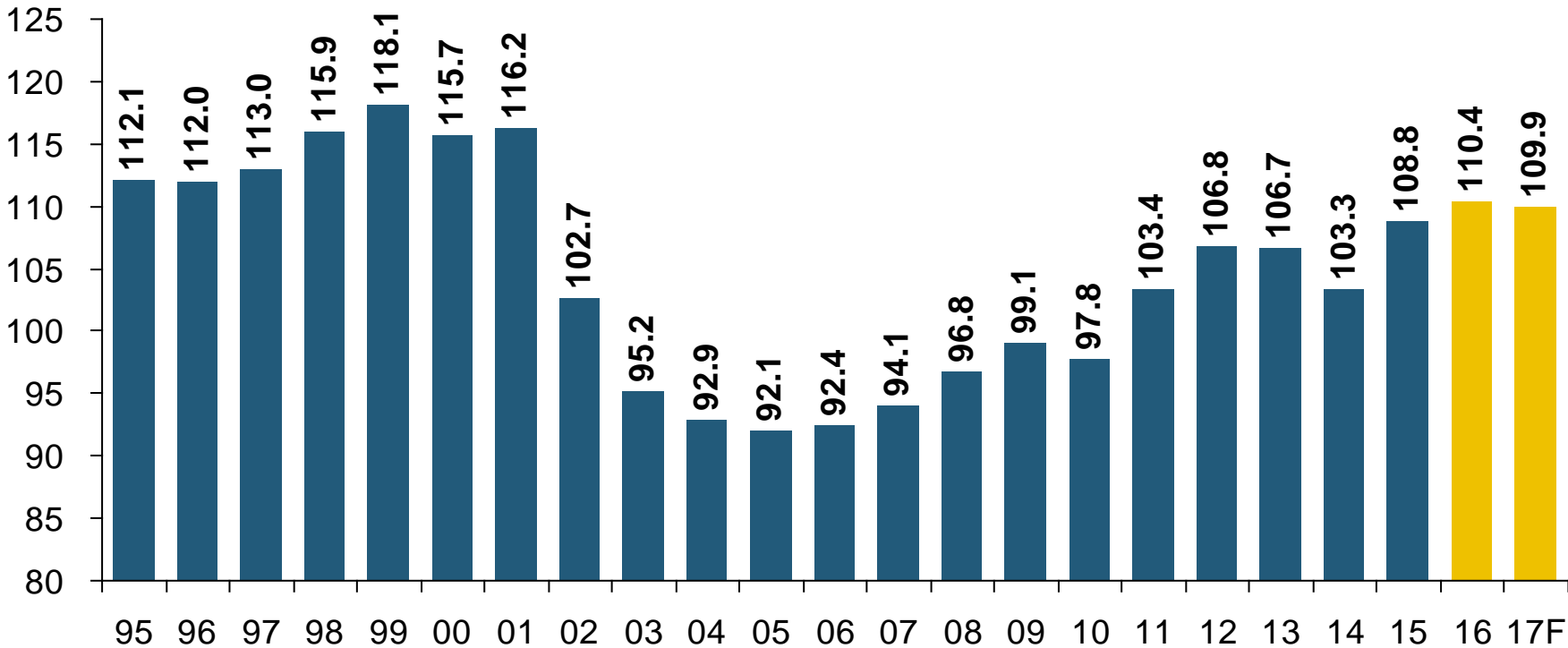
Sources: A.M. Best (1990-2016); USC RUM Center (2017E).

# 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.**

# Commercial Auto Combined Ratio: 1993–2017F

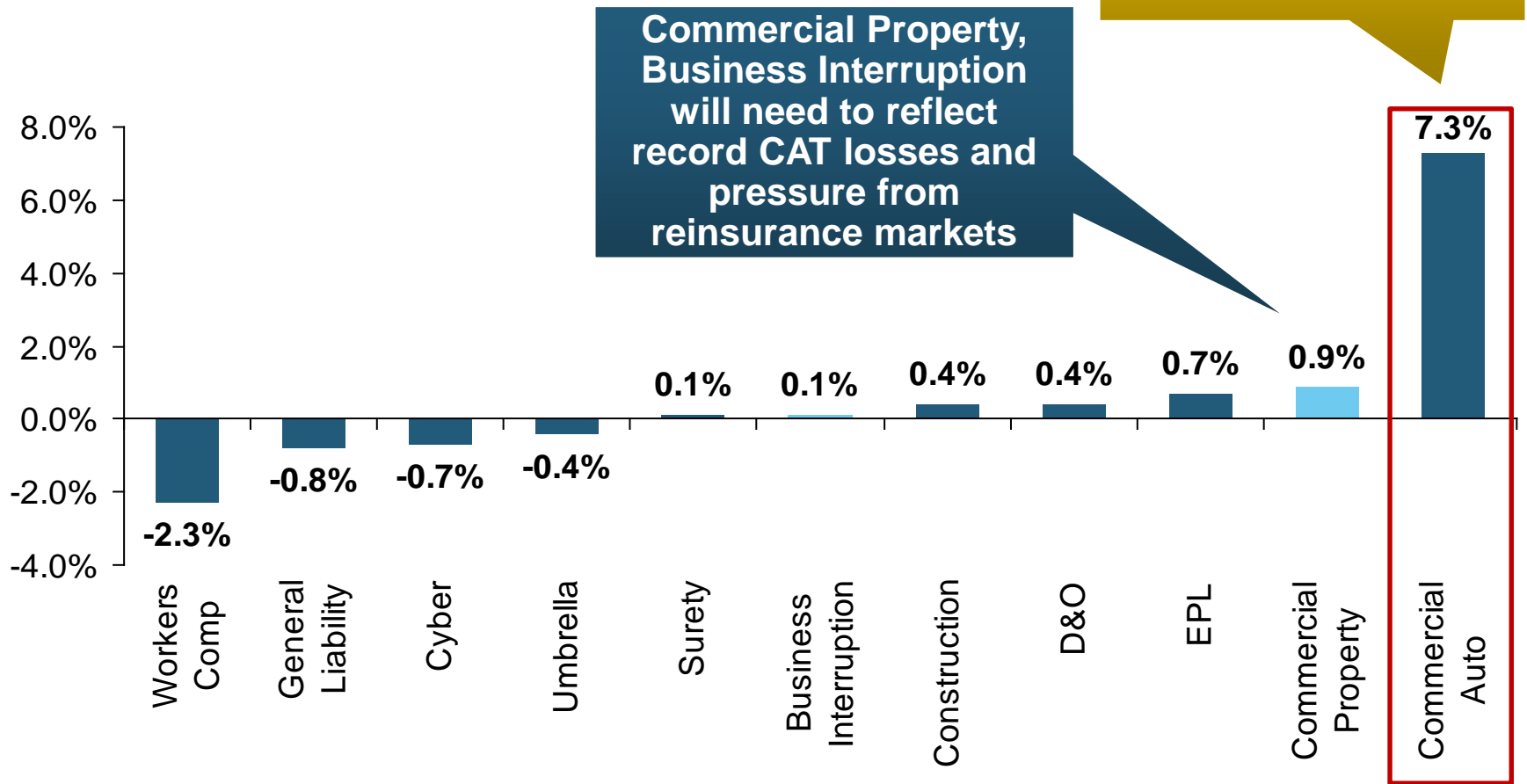


**Commercial Auto Results Are Challenged as Rate Gains Have Yet to Fully Offset Adverse Frequency and Severity Trends**

Sources: A.M. Best (1990-2016); USC RUM Center (2017E).

# Change in Commercial Rate Renewals, by Line: 2017:Q3

Percentage Change (%)



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.

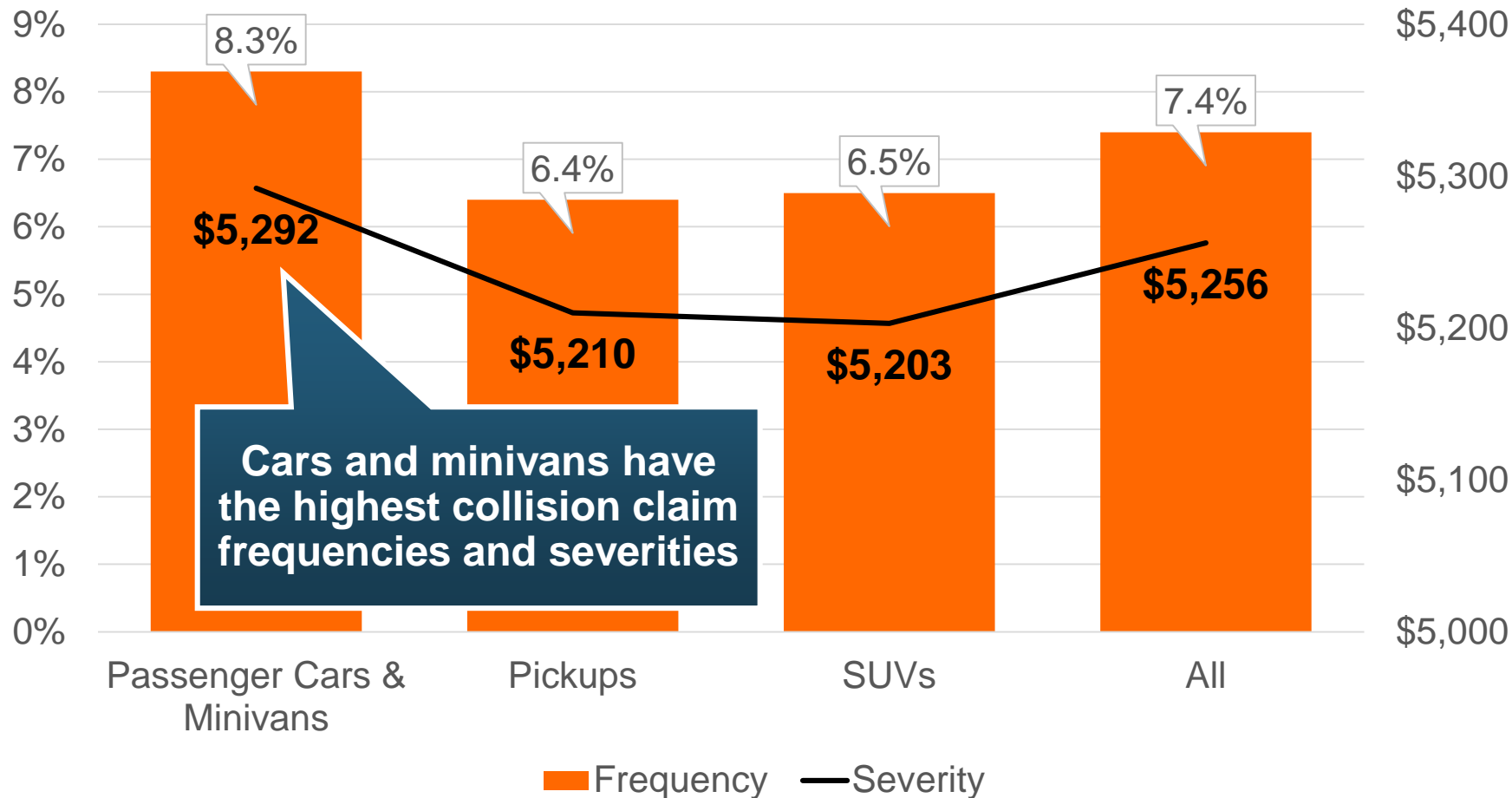


# **Claim Trends in Private Passenger Auto Insurance**

**Rising Frequencies and Severities  
in Many Coverages**

**Will that Pattern Be Sustained?**

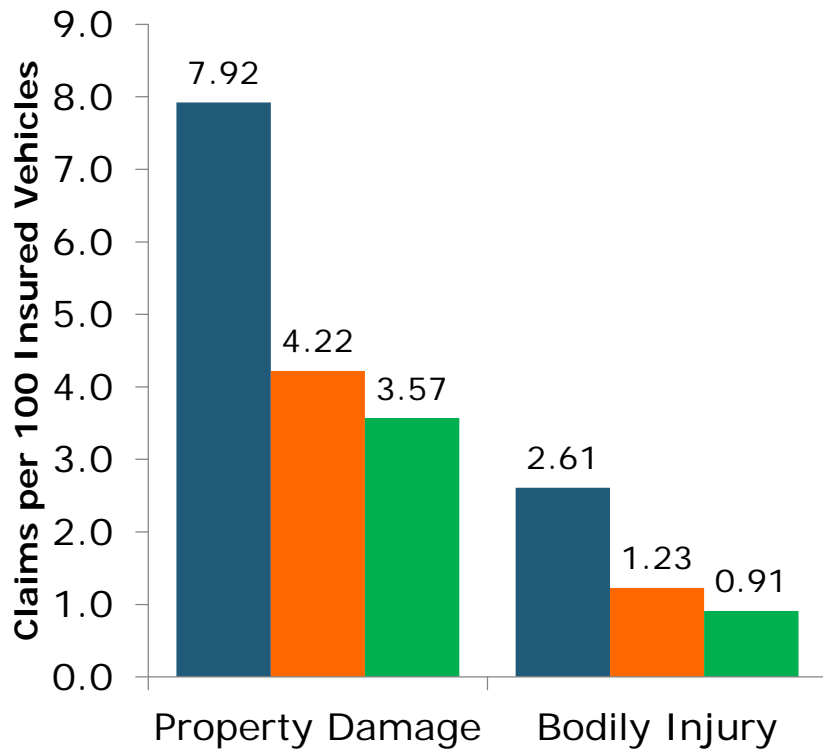
# Passenger Vehicle Collision Coverage Insurance Losses by Vehicle Type, 2014-2016 Model Years



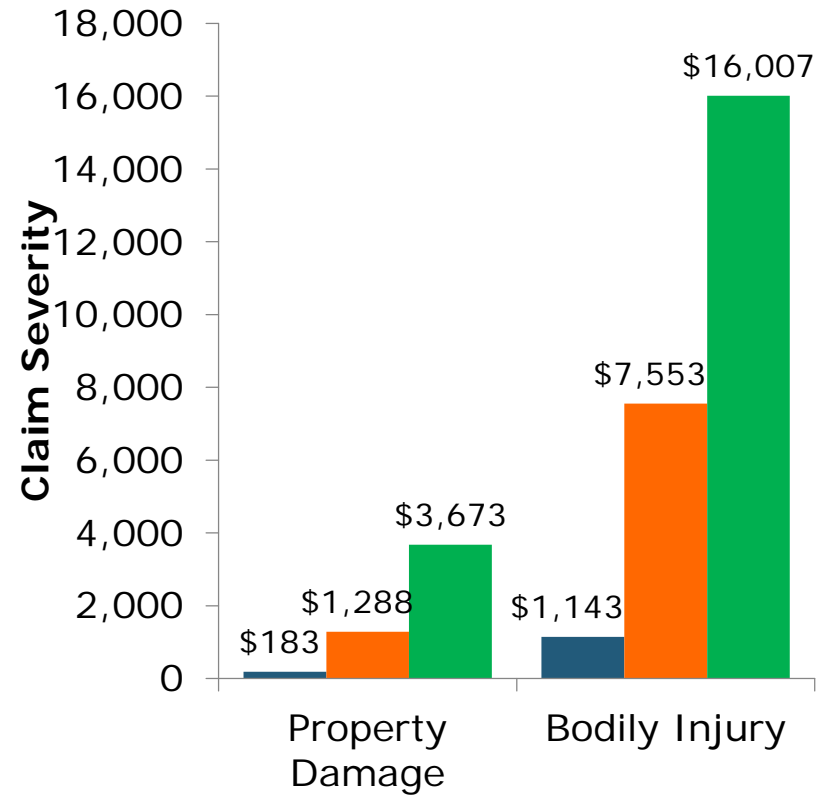
# A Half Century-Plus of Auto Insurance: Frequency vs. Severity

In the Long Run, Frequency Falls. Severity Increases.

## Frequency



## Severity



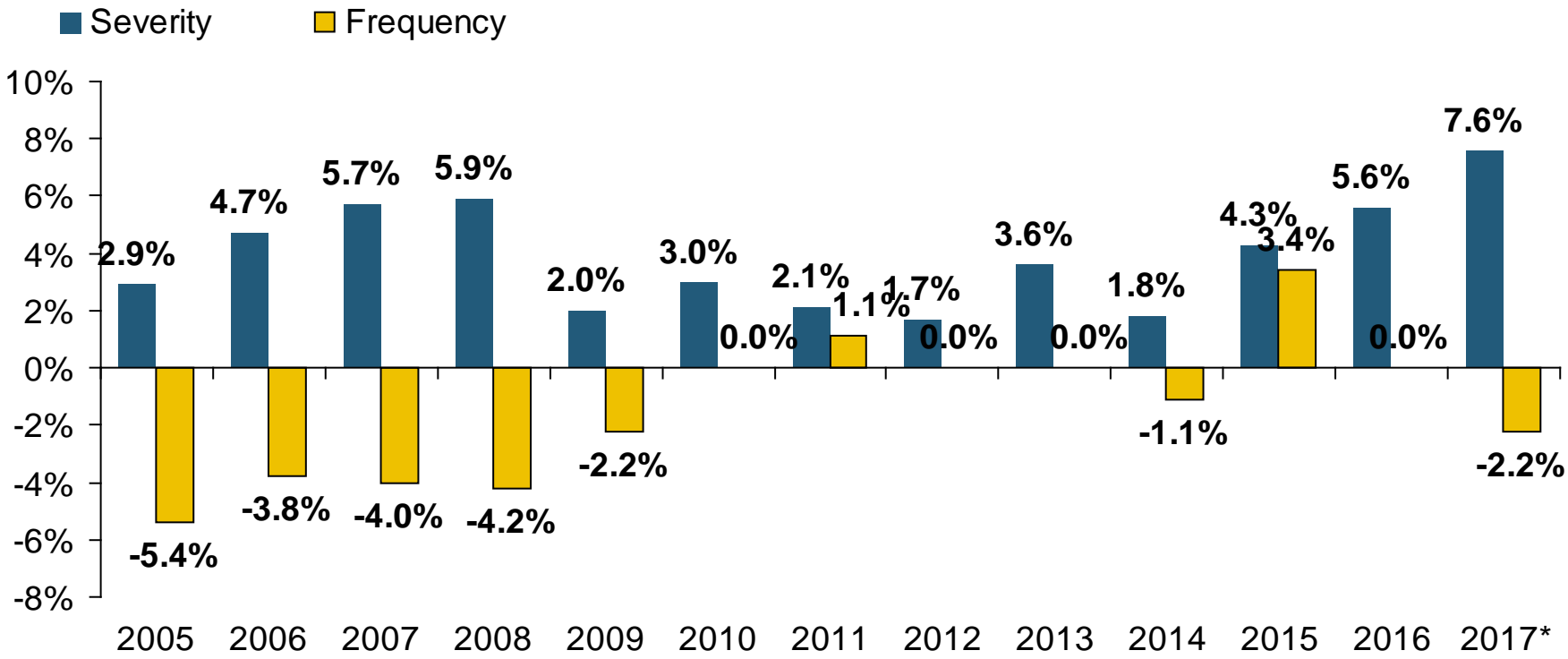
■ 1963 ■ 1988 ■ 2017\*

\*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\*

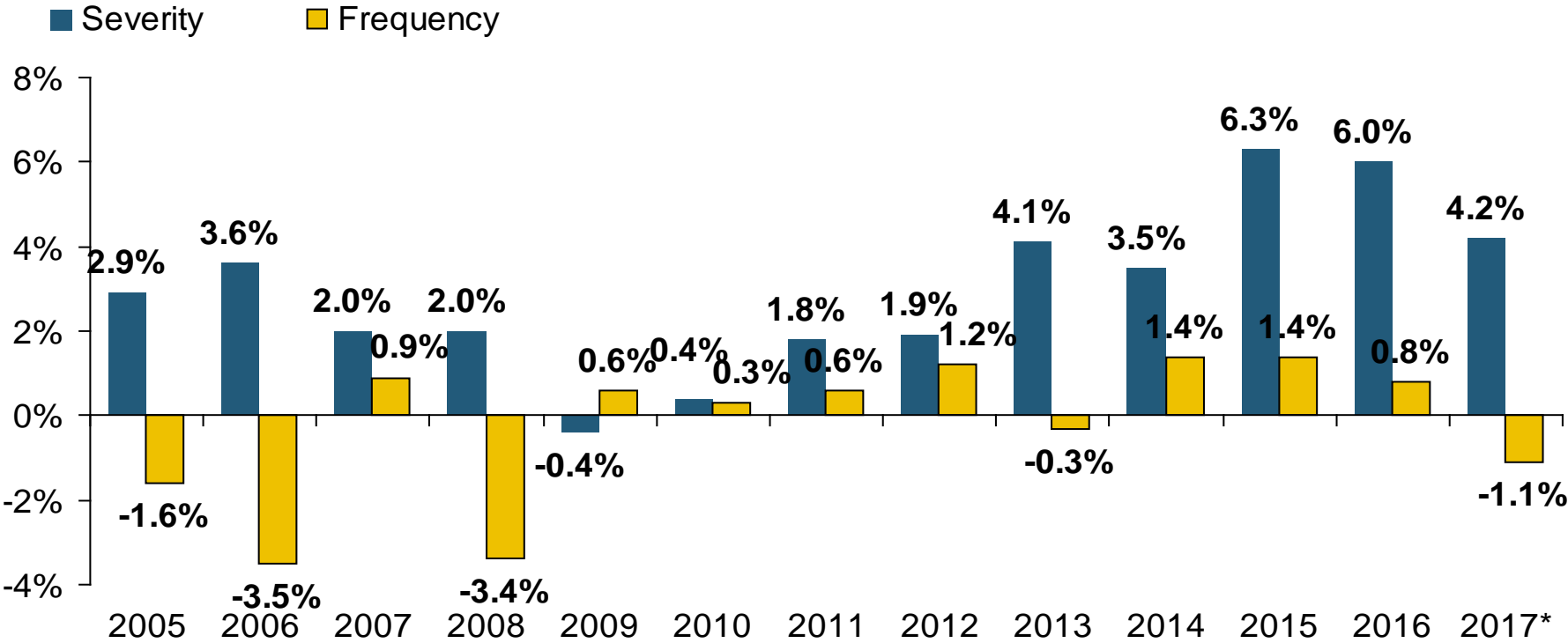


**BI Severity Trend is a Major Cost Driver**

\*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\*

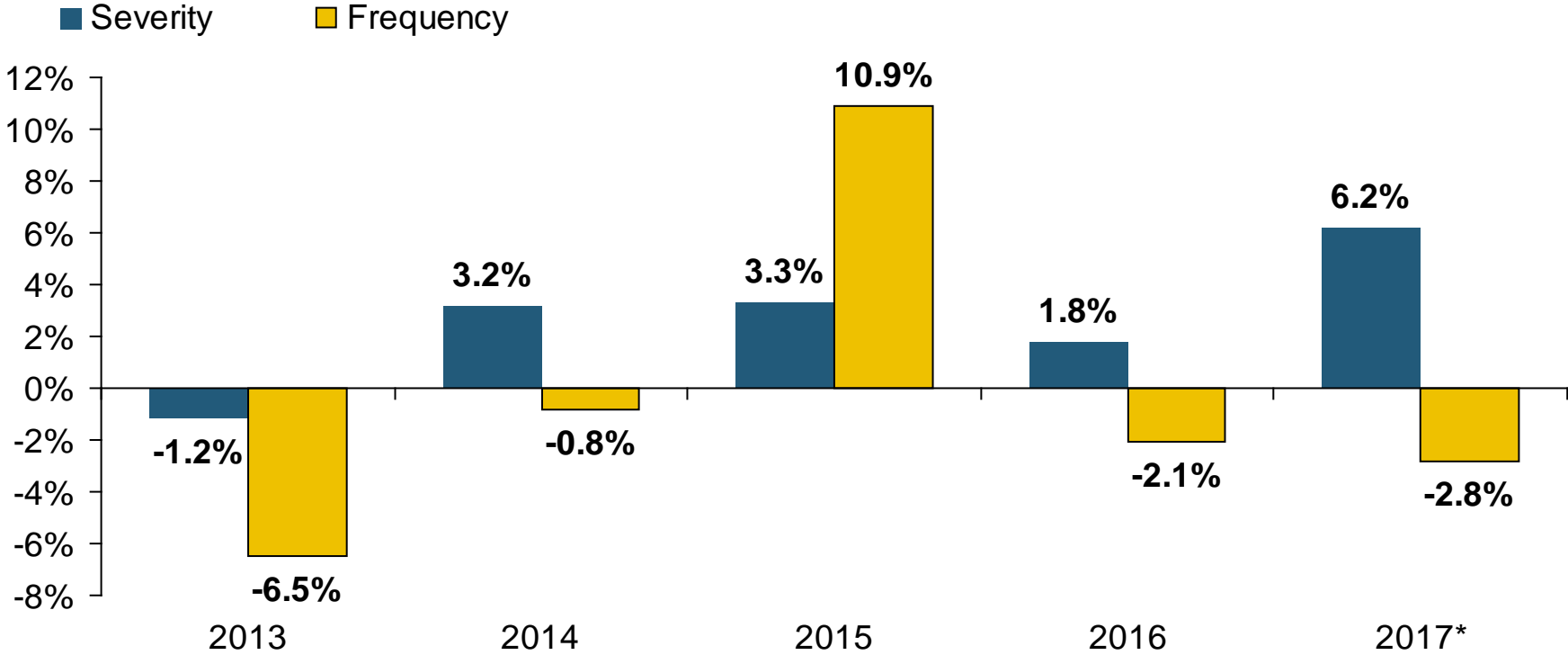


**Severity/Frequency Trends Have Been Volatile, But Rising Severity since 2011 Is a Concern**

\*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?

Annual Change, 2013 through 2017\*

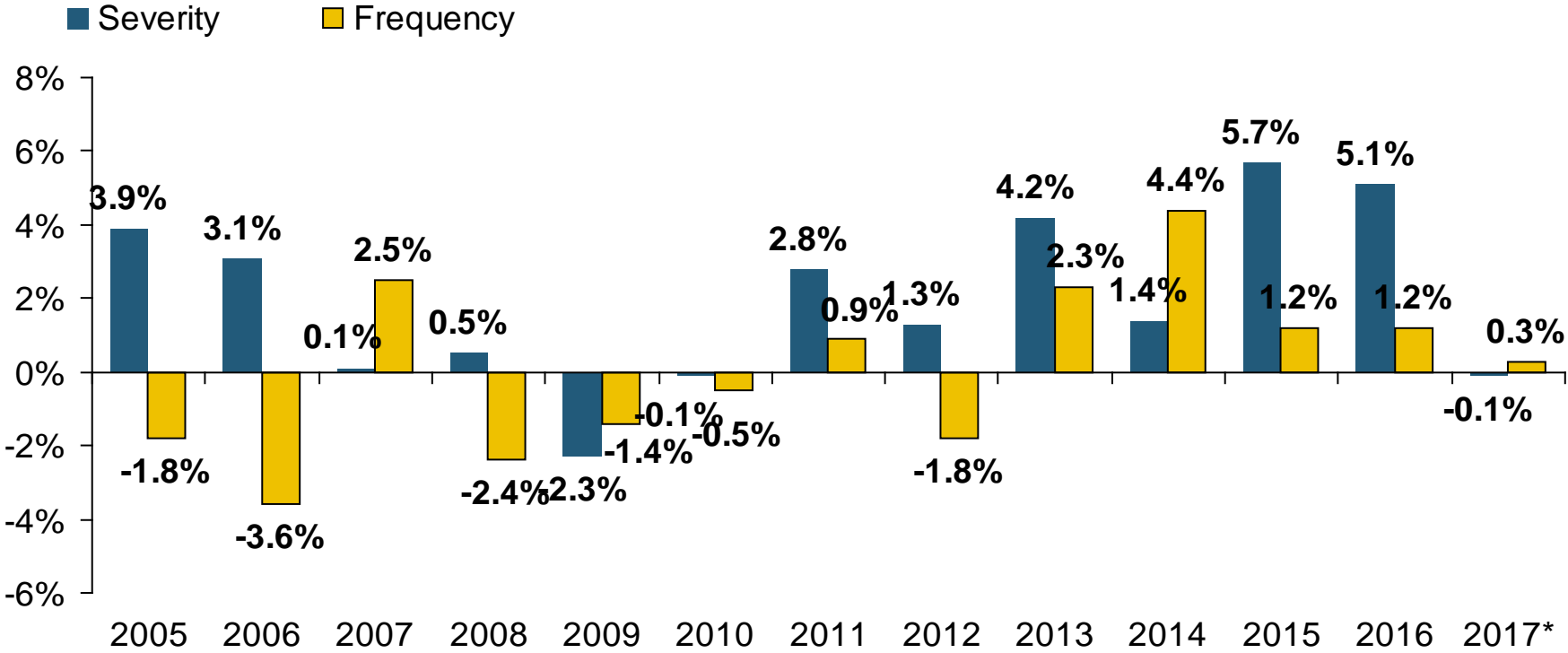


**No-Fault (PIP) Trends Have Been Volatile**

\*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\*



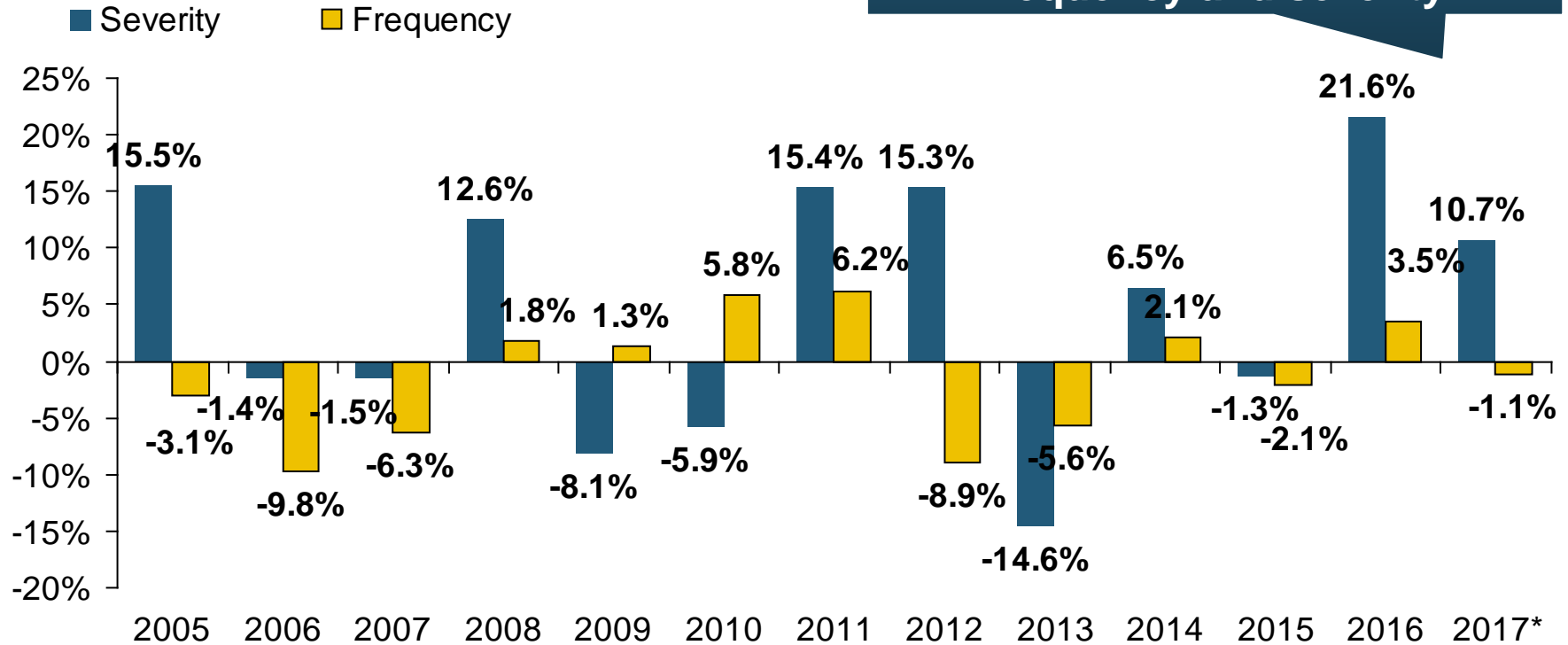
**The Recession, High Fuel Prices Helped Temper Frequency and Severity, But this Trend Has Clearly Reversed, Consistent with Experience from Past Recoveries**

\*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.

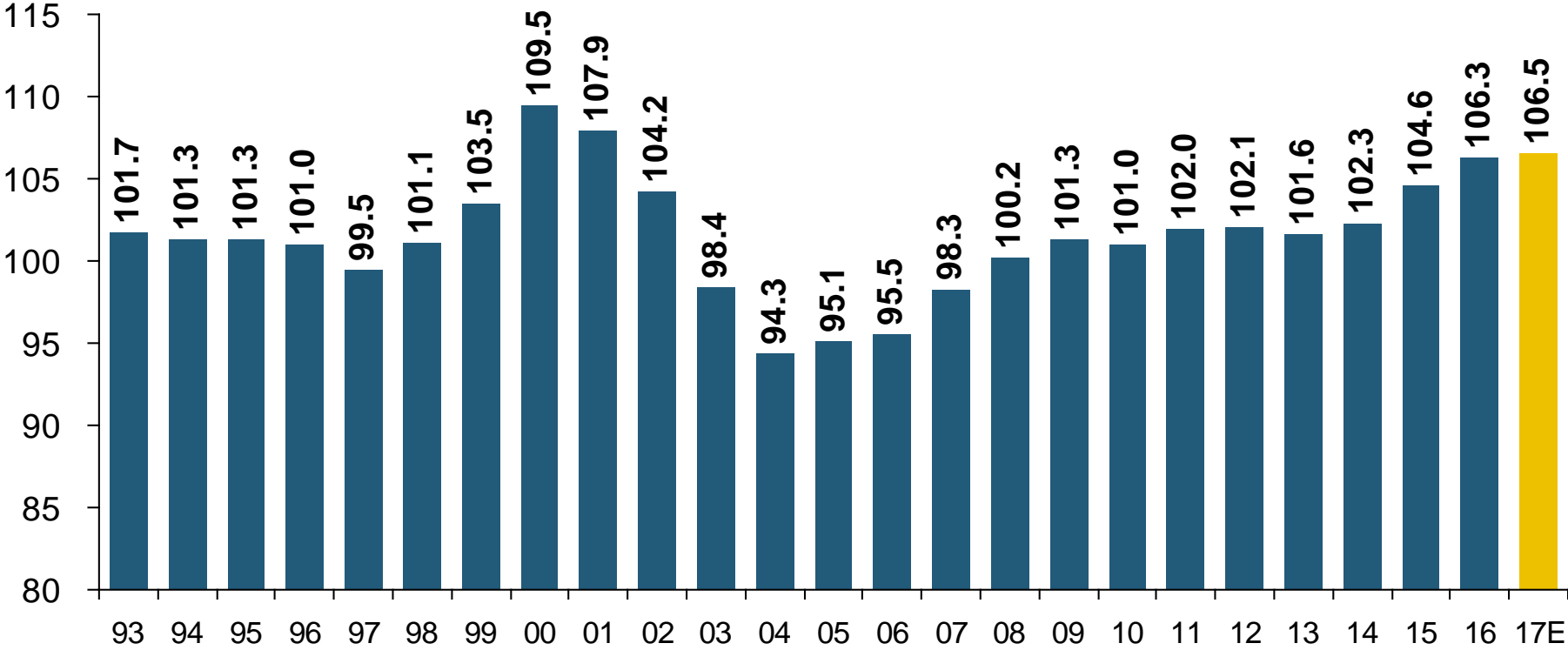
Source: ISO/PCI Fast Track data; Insurance Information Institute



# **Loss Ratio Analysis: Private Passenger Auto Insurance**

**Lost Ratios Have Generally Risen  
Over the Past Several Years**

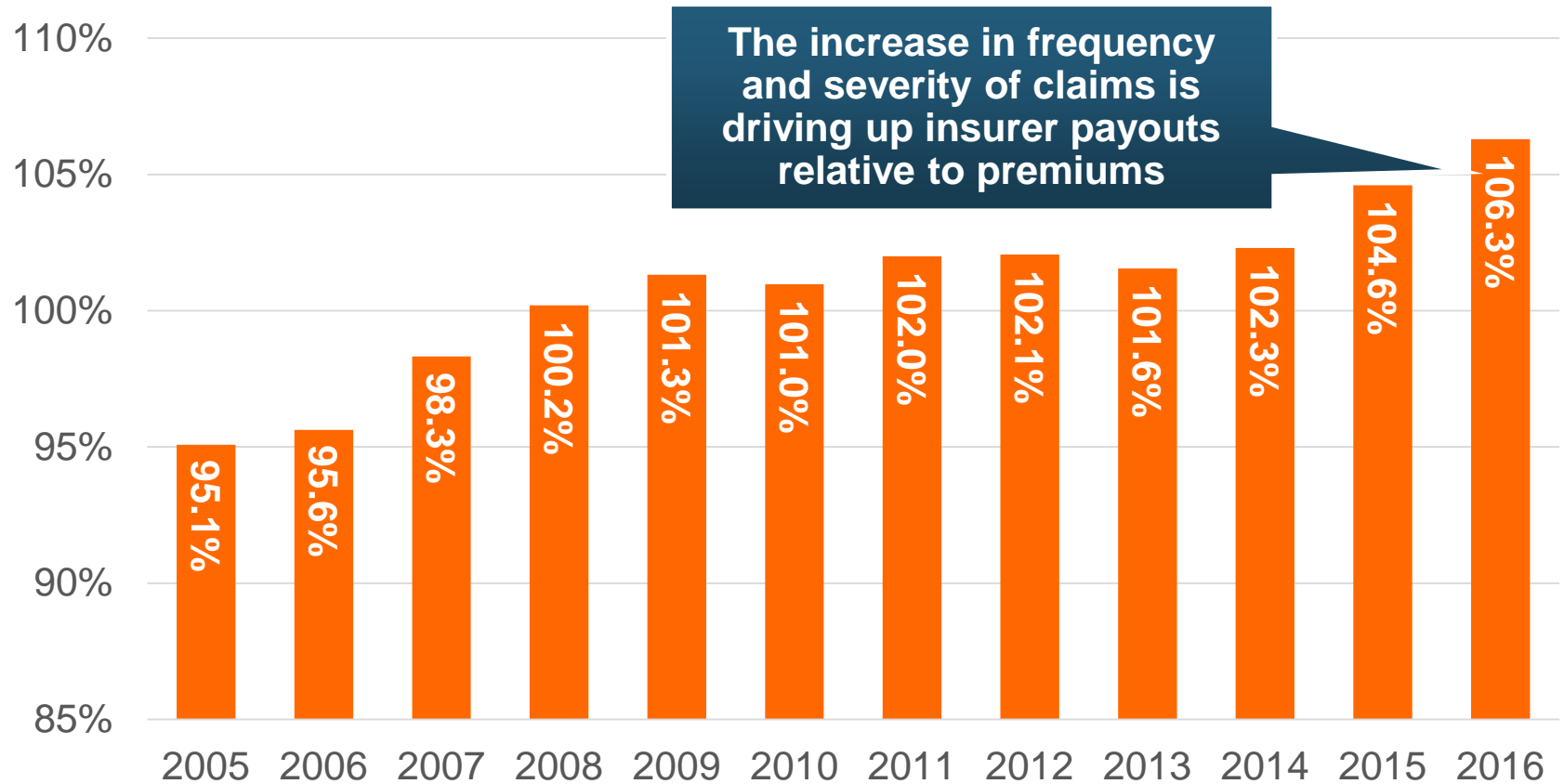
# Private Passenger Auto Combined Ratio: 1993–2017E



**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).

# US Pvt. Passenger Auto Net Combined Ratio, 2005-2016

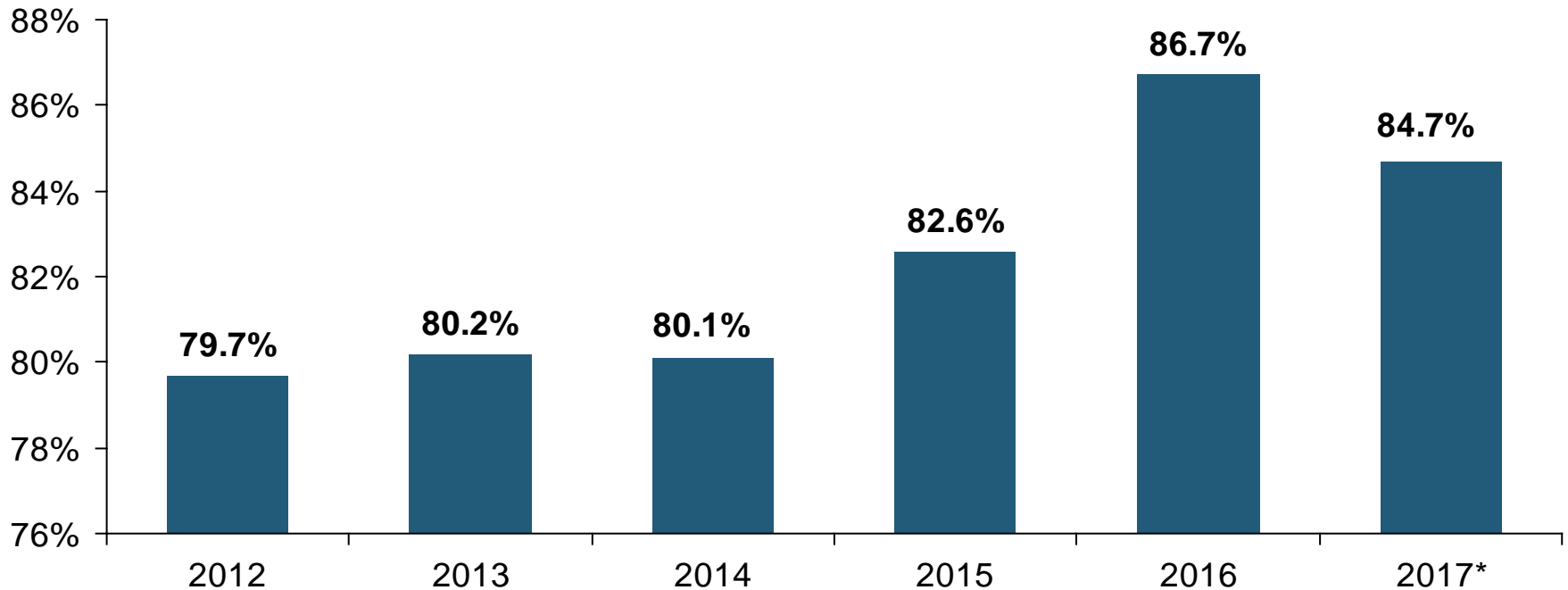


**Private Passenger Auto Insurance Loss Ratios Have Been Rising for A Decade and ROEs Have Been Falling.**

SOURCE: National Association of Insurance Commissioners data, sourced from S&P Global Market Intelligence, A.M. Best; Insurance Information Institute.

# Combined Liability and Phys. Damage Loss Ratio Up: Private Passenger Auto, 2012 – 2017\*

## Loss Ratio



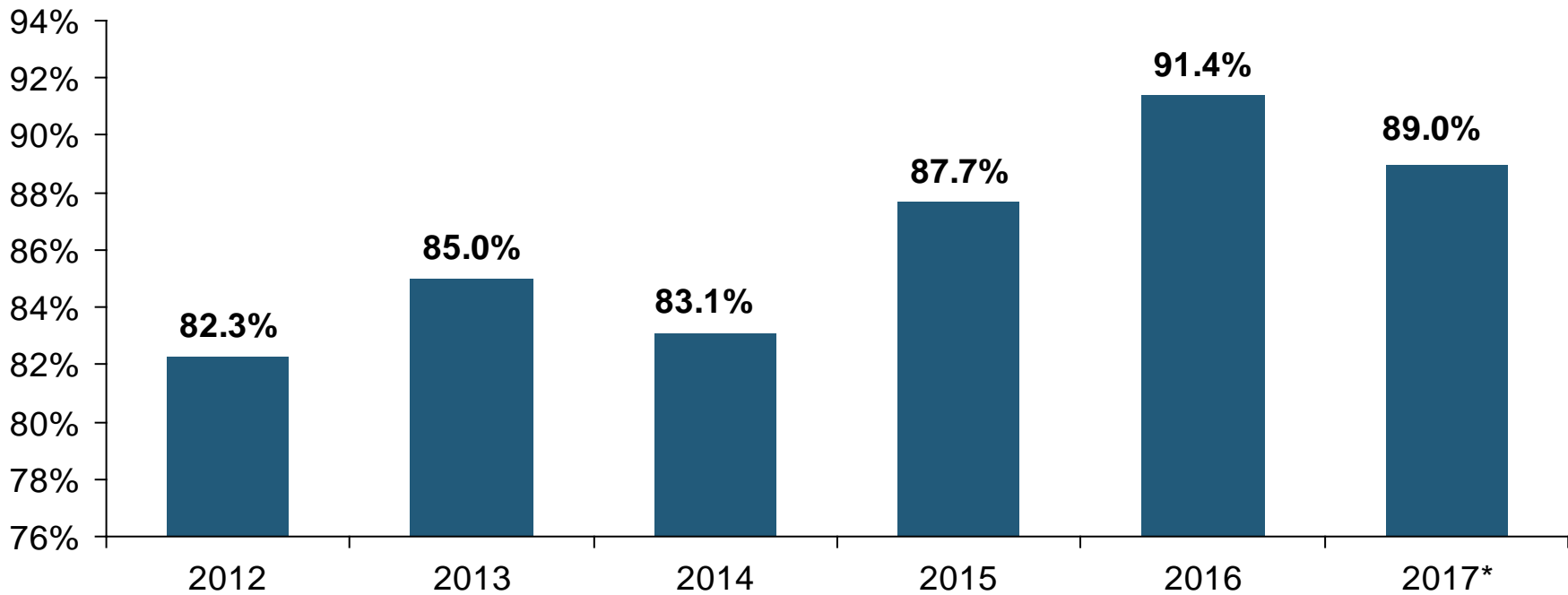
**The Loss Ratio Across All Physical Damage Coverages  
Has Trended Generally Upward for Years**

\*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\*

## Loss Ratio

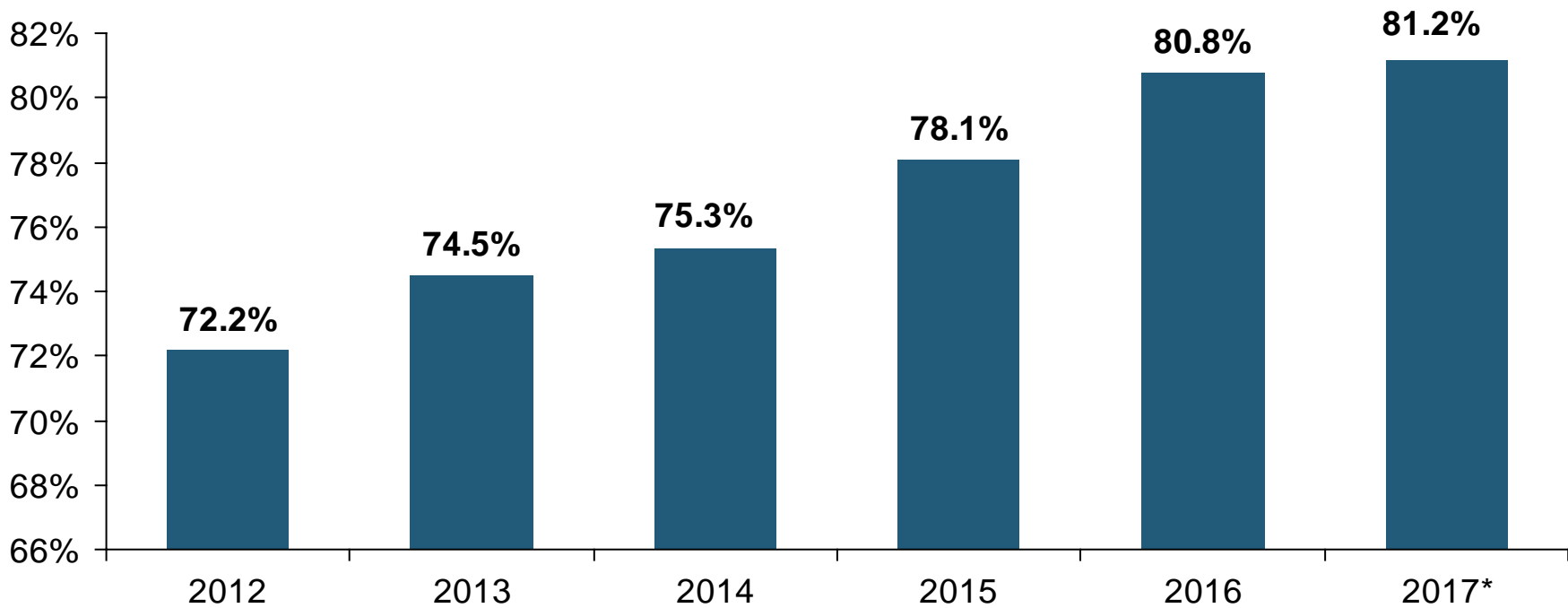


**Bodily Injury Loss Ratios Have Trended Generally Upward for Years**

\*2017 figure is for the 4 quarters ending in 2017:Q3  
Source: ISO/PCI *Fast Track* data; Insurance Information Institute

# All Phys. Dam Coverages Loss Ratio Up: Private Passenger Auto, 2012 – 2017\*

## Loss Ratio

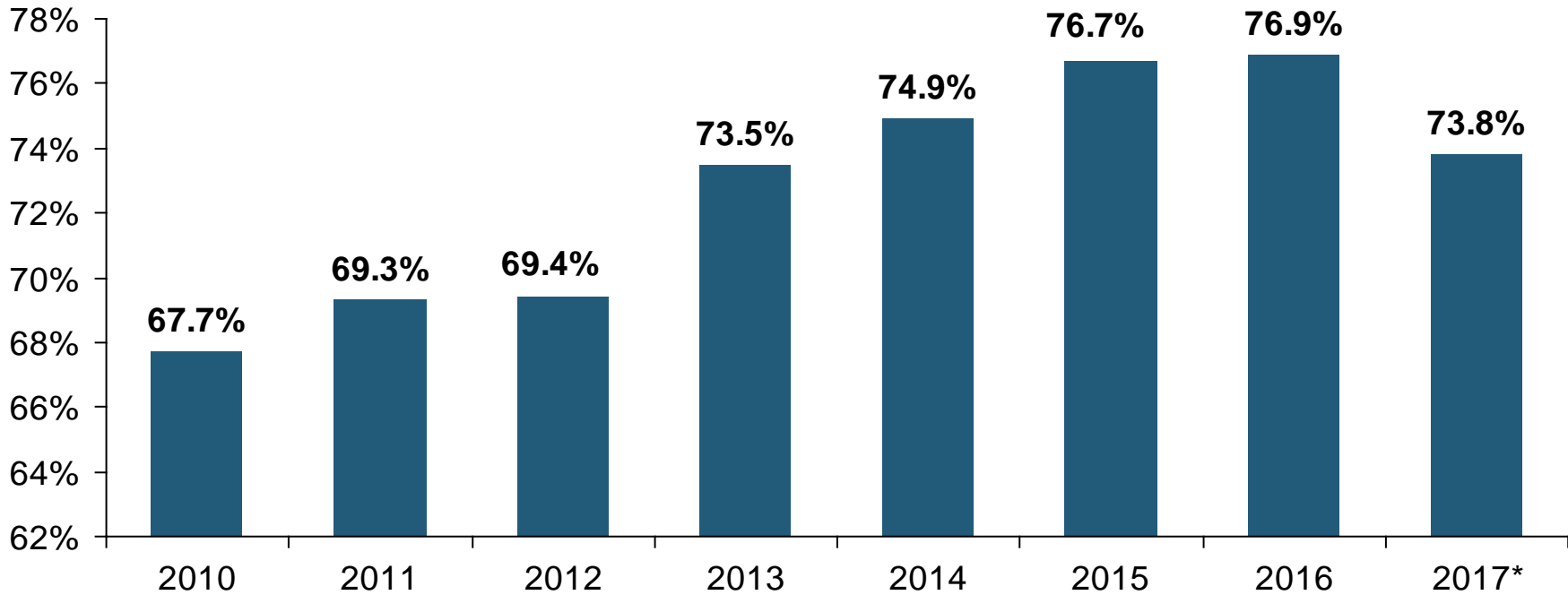


**The Loss Ratio Across All Physical Damage Coverages  
Has Trended Generally Upward for Years**

\*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

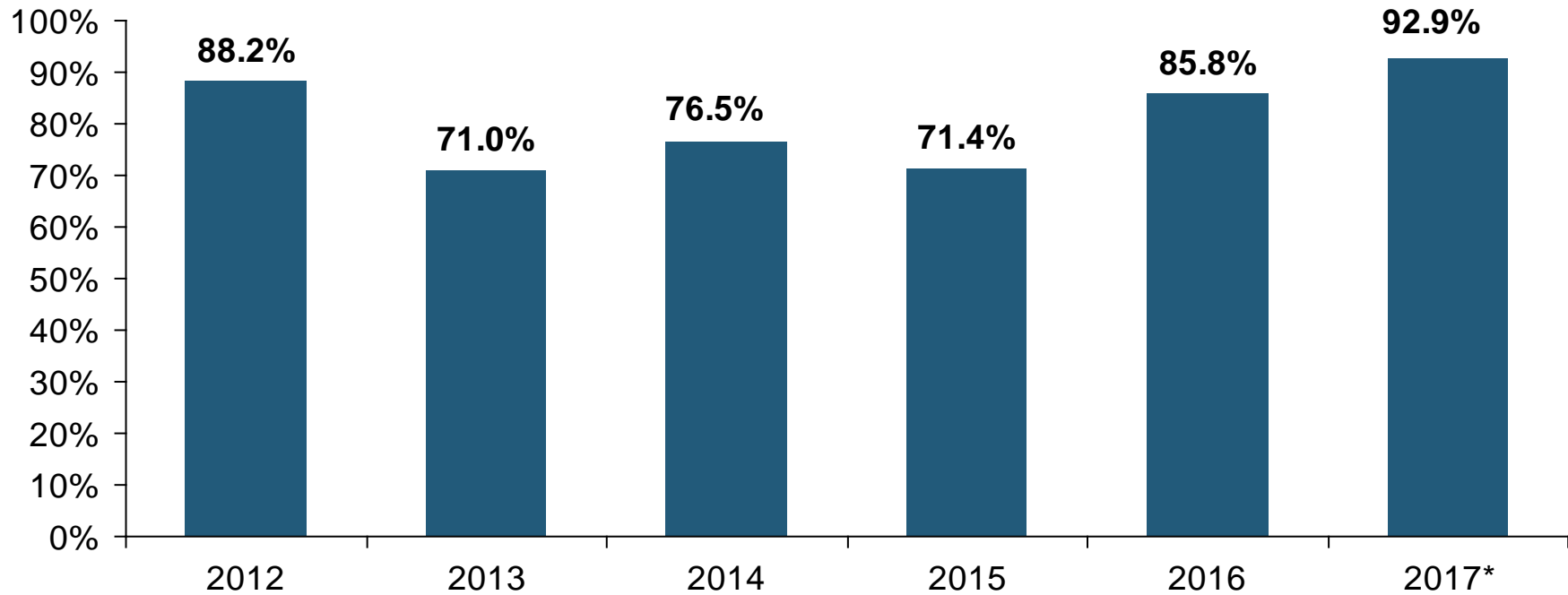


**Collision Loss Ratios Were Trending Steadily Upward  
Until Early 2017**

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

# Comprehensive Loss Ratio Is Elevated: Private Passenger Auto, 2010 – 2017\*

## Loss Ratio



**The Comprehensive Loss Ratio Stands at Mult-Year High, Pushed Upward in 2017 by Record CAT Activity**

\*2017 figure is for the 4 quarters ending in 2017:Q3  
Source: ISO/PCI *Fast Track* data; Insurance Information Institute





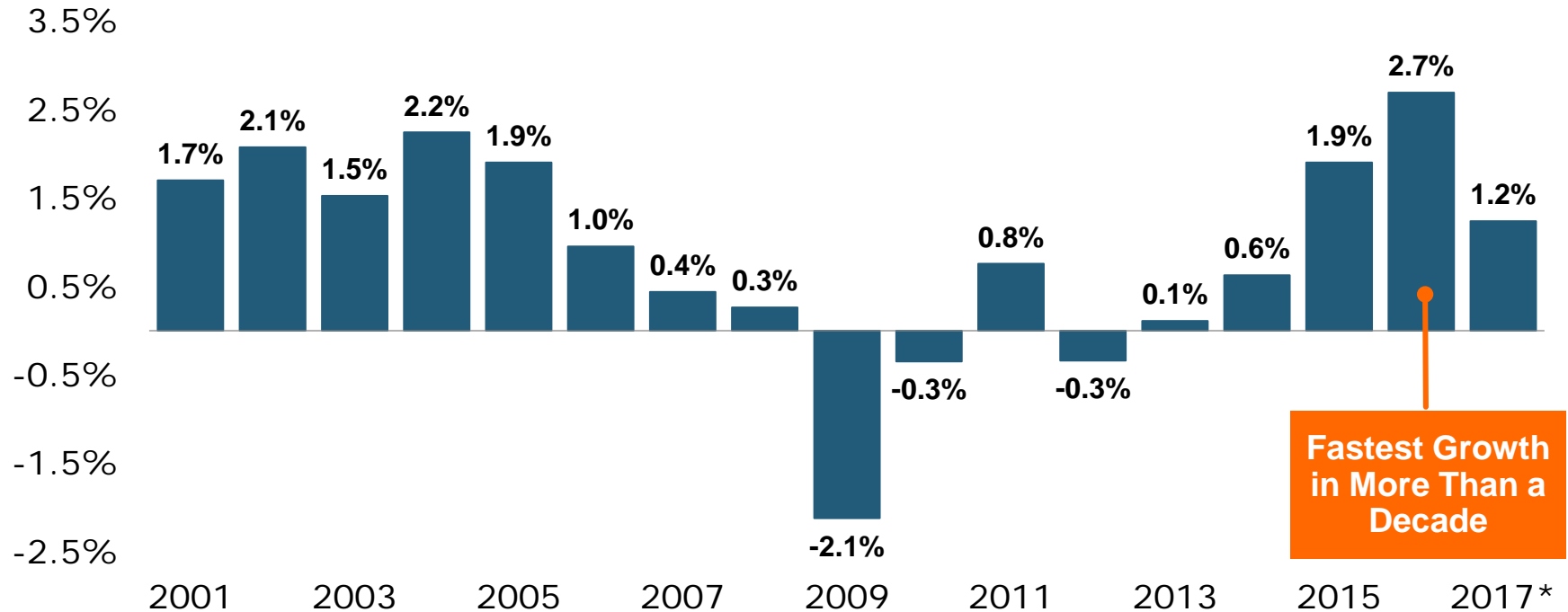
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## A Few Factors Driving Adverse Private Passenger Auto Loss Trends

**More Jobs, Better Economy, More People Driving, More Expensive Cars, Higher Speed Limits...**

# America is Driving More Again: 2000-2017

Percent Change, Miles Driven\*



**Fastest Growth  
in More Than a  
Decade**

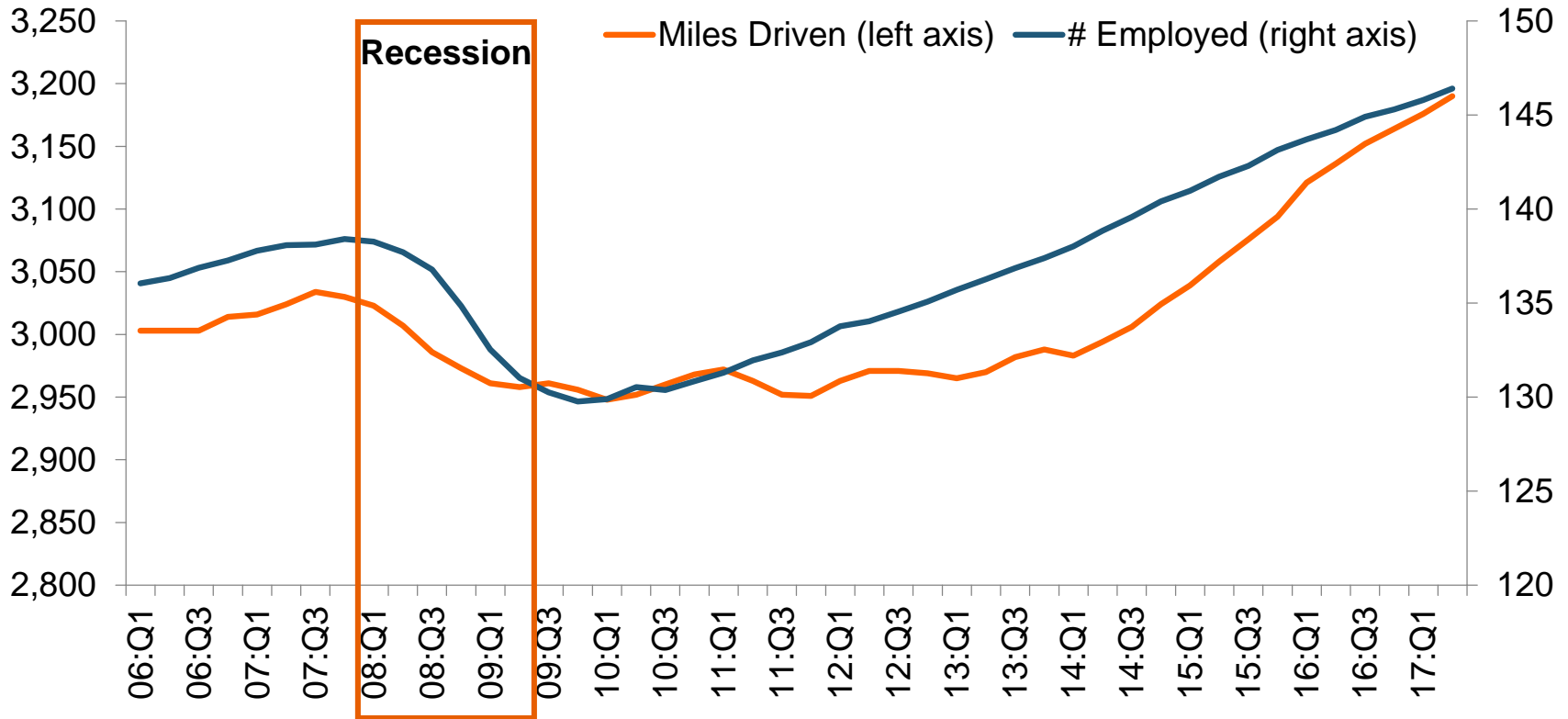
**Tremendous Growth In Miles Driven. The More People Drive, the More Frequently They Get Into Accidents.**

\*Moving 12-month total vs. prior year through December.  
Sources: [Federal Highway Administration](#); Insurance Information Institute.

# Why Are People Driving More Miles? Jobs? 2006–2017:Q2

Billions of Miles Driven in Prior Year

Millions Employed



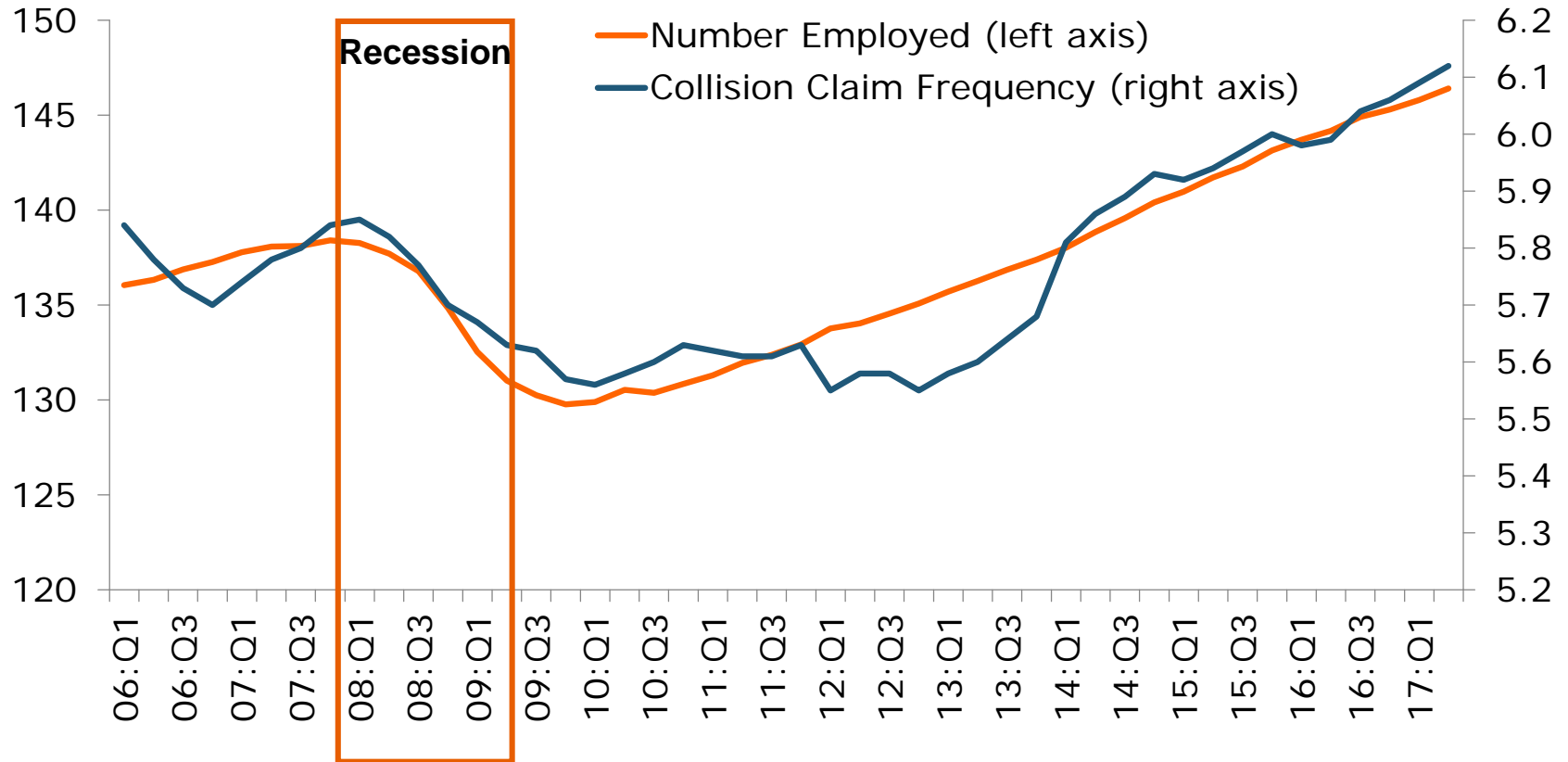
**People Drive to and from Work and Drive to Entertainment.  
Out of Work, They Curtail Their Movement.**

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 => More Collisions, 2006-2017:Q2

Number Employed, Millions

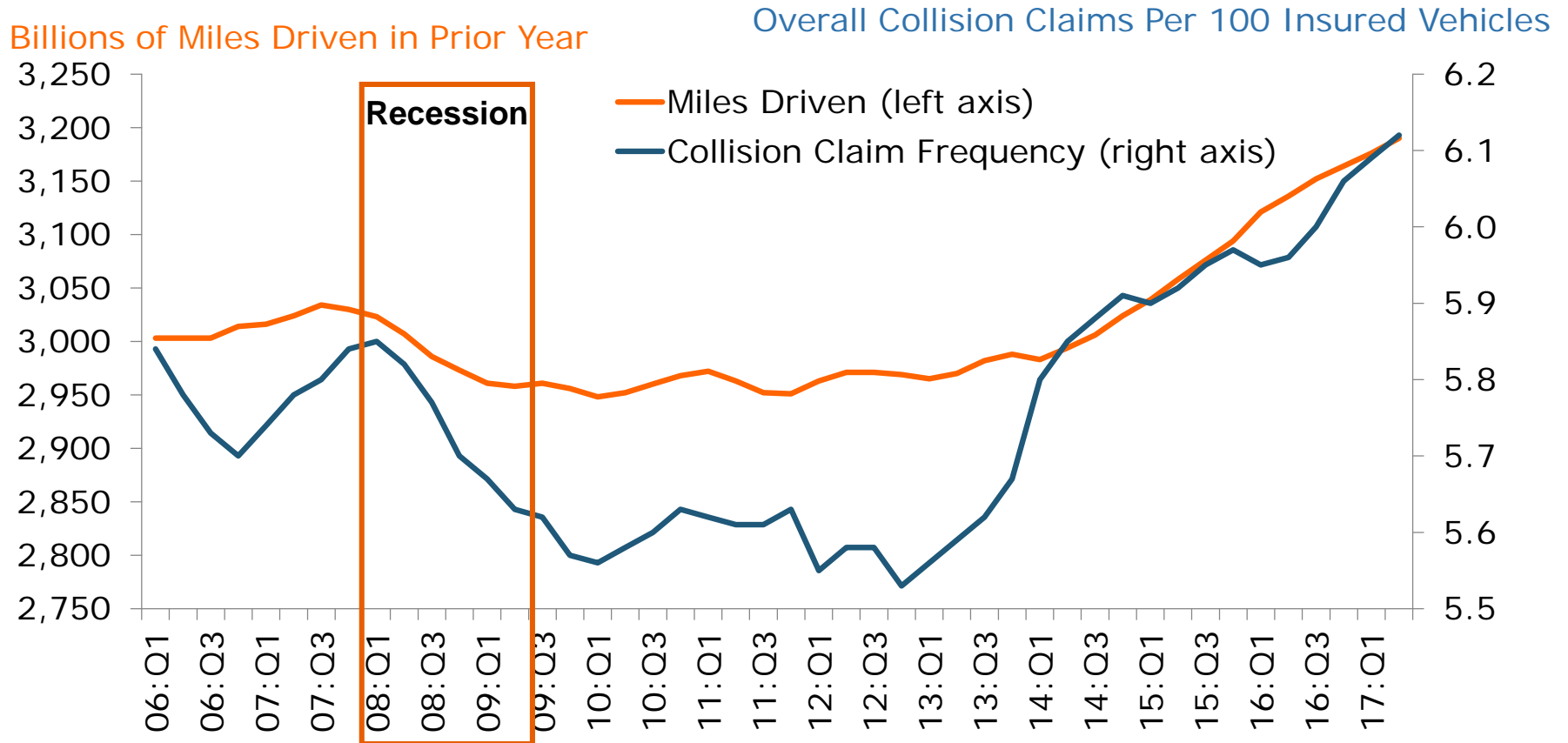
Overall Collision Claims Per 100 Insured Vehicles



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

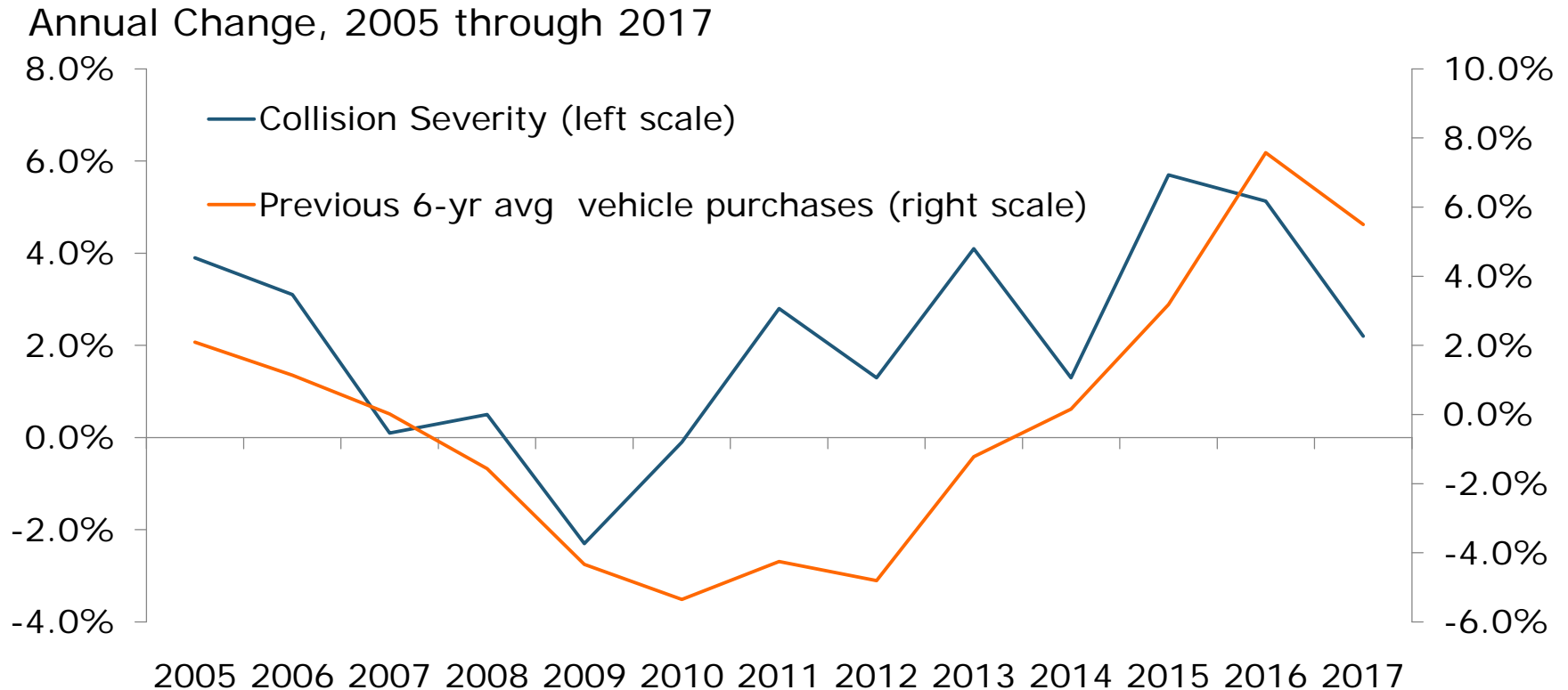
# More Miles Driven => More Collisions

## 2006-2017:Q2



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

# Does Spending on Vehicles Affect Claim Severity?

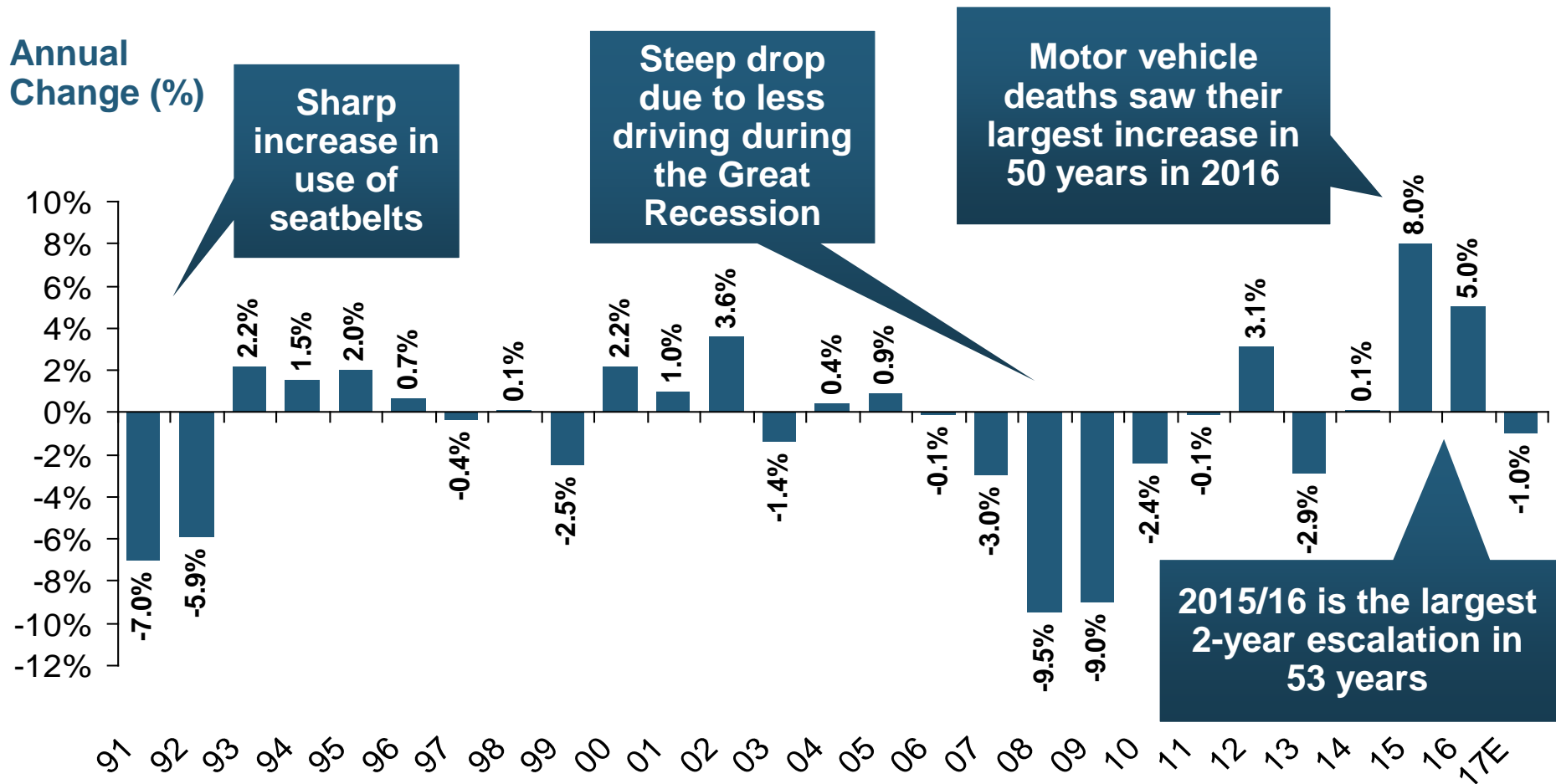


**As the Economy Has Gotten Better, People Are Spending More on Vehicles – When Those Cars Are in Accidents, Severity Increases.**

## **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...**

# U.S. Annual Change in Automobile Deaths, 1991- 2017E\*



**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.  
Source: National Safety Council.





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## Collision Repair Cost Drivers

**The Bottom Line:  
High Tech Vehicles Are Expensive  
to Repair**

# “Key to Key”: Vehicle Repair Times Are Increasing, 2013-2017

Driveable Flag	CY	Repair Cycle Time				Shop Productivity	
		Vehicle In to Repairs Started Days Avg	Repairs Started to Repairs Completed Days Avg	Repairs Completed to Vehicle Out Days Avg	Vehicle In to Vehicle Out Days Avg	Labor Hrs per Repair Day	Labor Hrs per Shop Day
Driveable	CY2013	0.6	5.3	0.8	6.7	4.2	3.4
	CY2014	0.7	5.7	0.8	7.2	3.9	3.0
	CY2015	0.6	5.8	0.9	7.3	3.8	3.0
	CY2016	0.6	6.3	0.9	7.8	3.6	2.9
	CY2017	0.6	6.3	0.9	7.8	3.6	2.9
Non-Driveable	CY2013	2.5	11.3	1.4	15.2	3.6	2.8
	CY2014	3.2	12.7	1.2	17.0	3.1	2.3
	CY2015	2.9	13.3	1.3	17.4	3.0	2.3
	CY2016	2.7	13.9	1.4	18.1	2.9	2.2
	CY2017	2.5	13.6	1.3	17.4	2.9	2.2
TOTAL	CY2013	1.0	6.6	0.9	8.5	4.0	3.2
	CY2014	1.2	7.1	0.8	9.1	3.6	2.8
	CY2015	1.0	7.2	0.9	9.2	3.5	2.8
	CY2016	1.0	7.7	1.0	9.7	3.4	2.6
	CY2017	0.9	7.6	1.0	9.5	3.4	2.7

**Driveable  
+0.6 days  
(+18.9%)**

**Non-Driveable  
+2.3 days  
(+20.3%)**

**Total  
+1.0 days  
(+15.2%)**

Source: CCC accessed via PropertyCasualty360.com at:

<https://www.propertycasualty360.com/native/?mvi=204cd819dff479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bbb8c0ebe08e5a1c9&mvpflabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&slreturn=20180205153245>

# Direct Repair Program Vehicle Volume by Repair Cost Range and Drivability, 2013-2017

Repair Cost Ranges	CY2013	CY2014	CY2015	CY2016	CY2017
\$0.01 to \$500.00	3.5%	3.2%	3.0%	2.6%	2.4%
\$500.01 to \$1,000.00	16.5%	15.8%	15.4%	14.3%	13.5%
\$1,000.01 to \$2,000.00	29.8%	29.5%	29.5%	28.9%	28.7%
\$2,000.01 to \$3,000.00	18.6%	18.9%	19.2%	19.5%	19.8%
\$3,000.01 to \$4,000.00	11.2%	11.5%	11.7%	12.1%	12.4%
\$4,000.01 to \$5,000.00	7.1%	7.3%	7.3%	7.7%	7.9%
\$5,000.01 to \$6,000.00	4.5%	4.7%	4.7%	5.0%	5.1%
\$6,000.01 to \$10,000.00	6.8%	7.1%	7.1%	7.7%	7.8%
\$10,000.01 to \$15,000.00	1.6%	1.7%	1.7%	1.9%	1.8%
\$15,000.01 to \$20,000.00	0.30%	0.31%	0.34%	0.38%	0.37%
\$20,000.01 & Up	0.10%	0.10%	0.11%	0.14%	0.13%
	CY2013	CY2014	CY2015	CY2016	CY2017
Non-Driveable %	22.1%	19.5%	18.2%	18.1%	17.3%

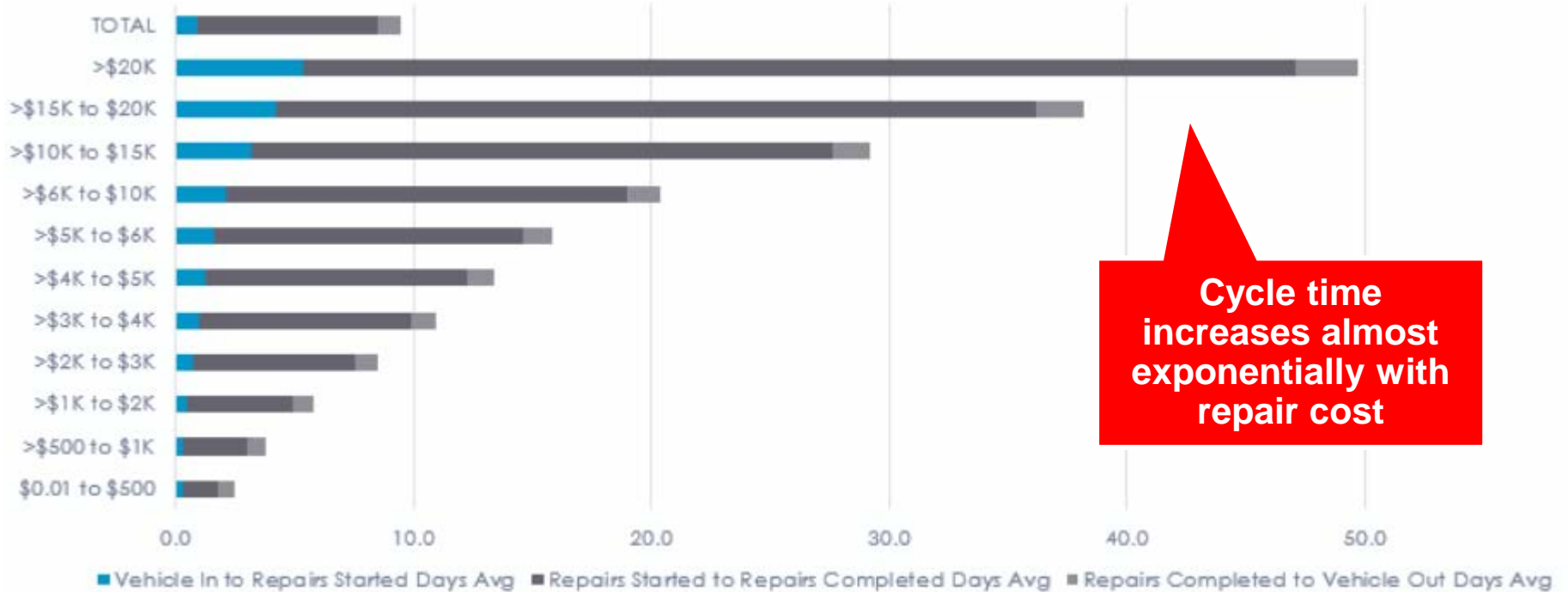
Repair costs have been drifting upward

Non-driveable share has been declining

Source: CCC accessed via PropertyCasualty360.com at:

<https://www.propertycasualty360.com/native/?mvi=204cd819dff479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bbb8c0ebe08e5a1c9&mvpflabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&slreturn=20180205153245>

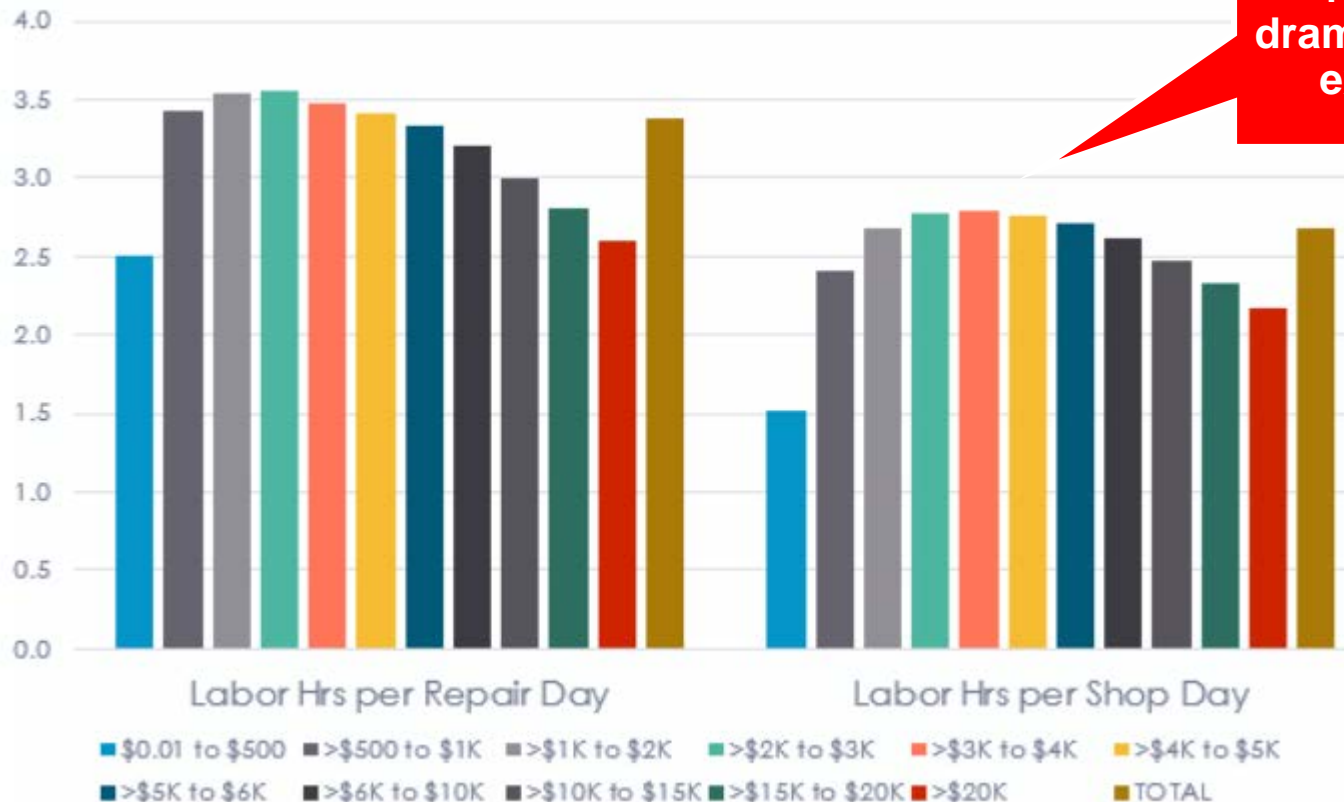
# DRP Cycle Time (Avg. Vehicle-in-to-Out Days) by Repair Cost Range, 2017



Source: CCC accessed via PropertyCasualty360.com at:

<https://www.propertycasualty360.com/native/?mvi=204cd819dff479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bbb8c0ebe08e5a1c9&mvpflabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&slreturn=20180205153245>

# DRP Shop Productivity by Repair Cost Range, 2017

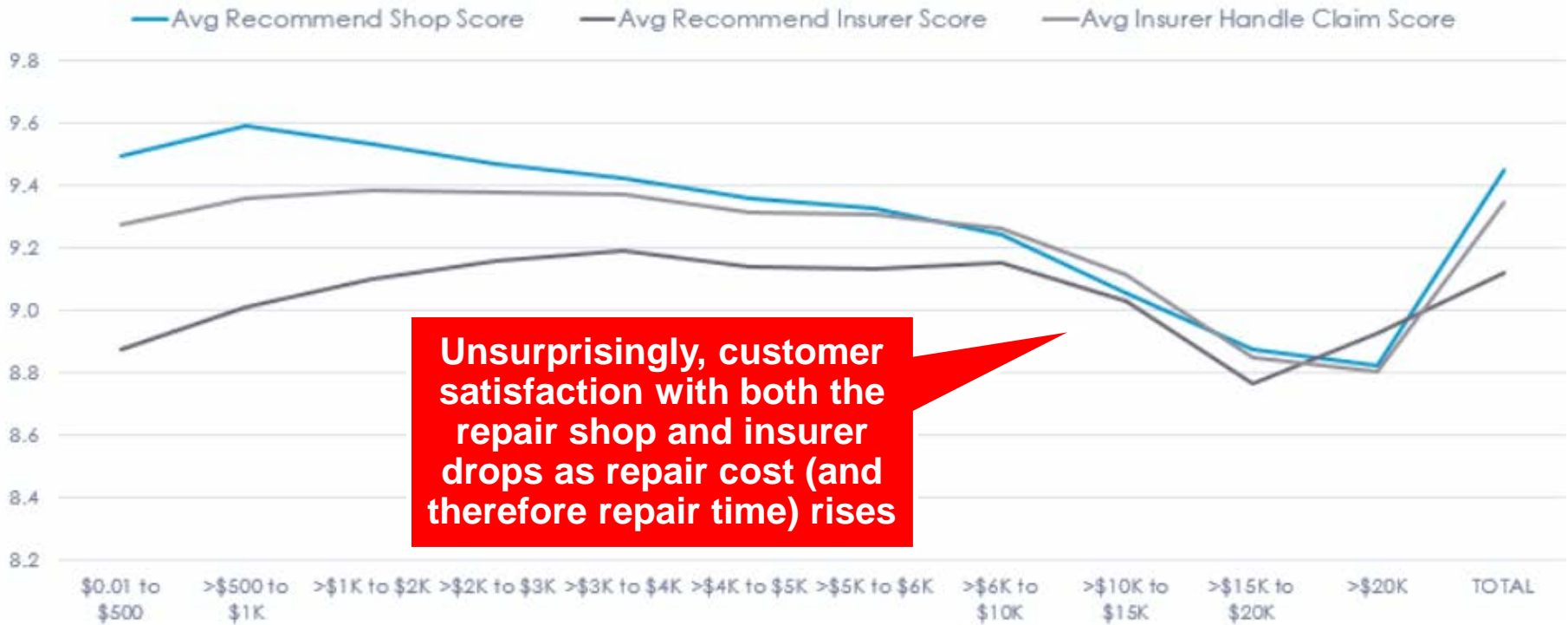


Productivity of repairs falls dramatically for more expensive jobs

Source: CCC accessed via PropertyCasualty360.com at:

<https://www.propertycasualty360.com/native/?mvi=204cd819dff479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bbb8c0ebe08e5a1c9&mvplabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&slreturn=20180205153245>

# DRP Repair Customer Satisfaction by Repair Cost Range, 2017

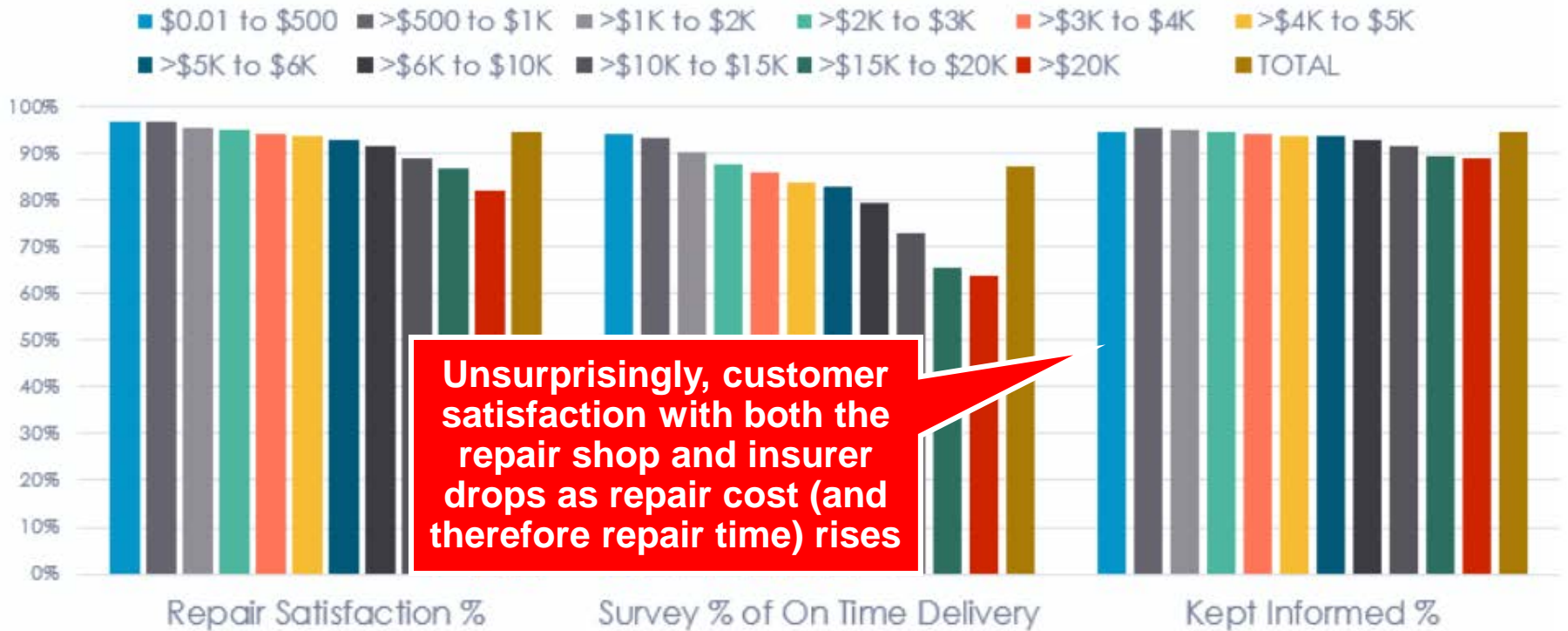


Unsurprisingly, customer satisfaction with both the repair shop and insurer drops as repair cost (and therefore repair time) rises

Source: CCC accessed via PropertyCasualty360.com at:

<https://www.propertycasualty360.com/native/?mvi=204cd819dffd479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bbb8c0ebe08e5a1c9&mvplabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&slreturn=20180205153245>

# DRP Repair Customer Satisfaction by Repair Cost Range, 2017

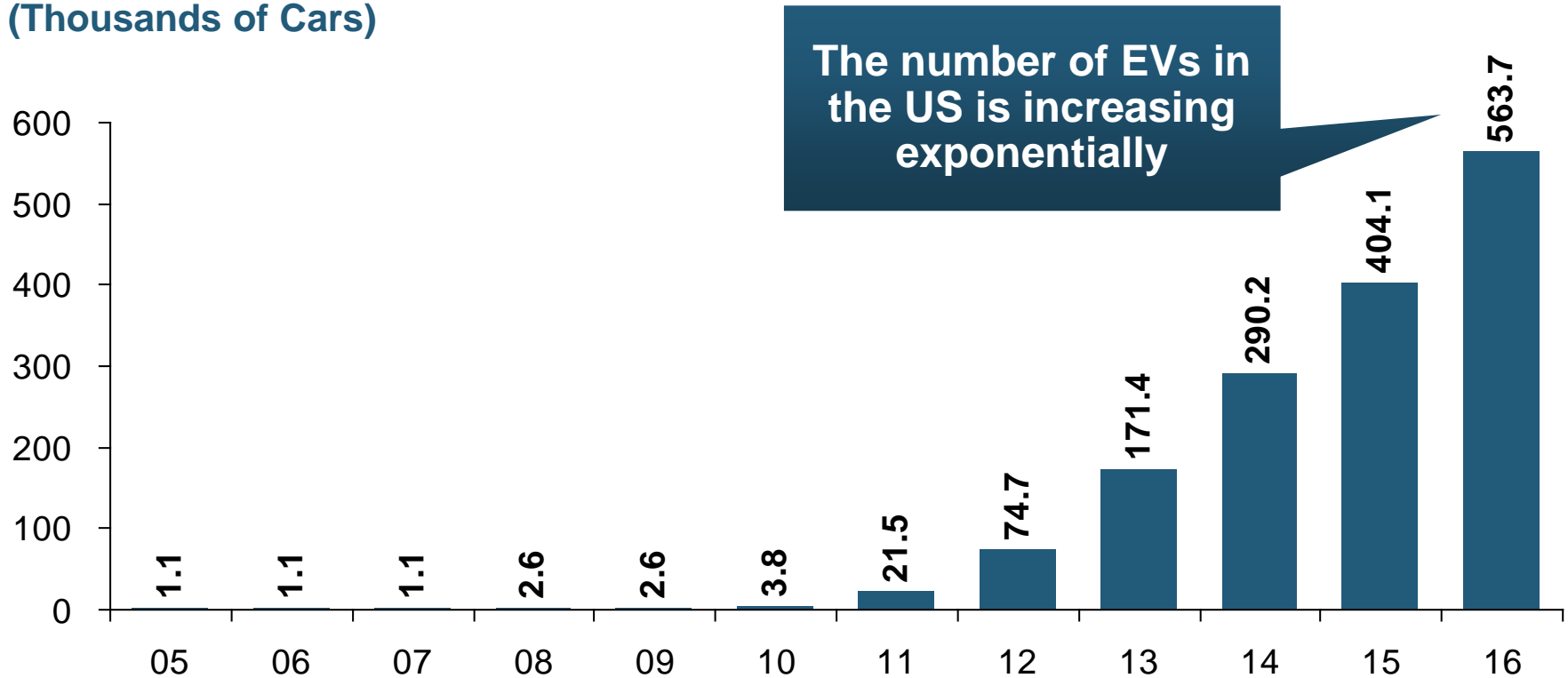


Source: CCC accessed via PropertyCasualty360.com at:

<https://www.propertycasualty360.com/native/?mvi=204cd819dffd479f9551e33dc691c4a8&mvpf=e9c65c7f741c449bbb8c0ebe08e5a1c9&mvplabel=&et=editorial&bu=PC360&cn=20180305&src=EMC-Email&pt=Daily&slreturn=20180205153245>

# Electric Car Stock in the US: 2005–2016\*

(Thousands of Cars)



**Household energy demand arising from  
vehicles will continue to soar**

\*Includes plug-in vehicles and hybrids.

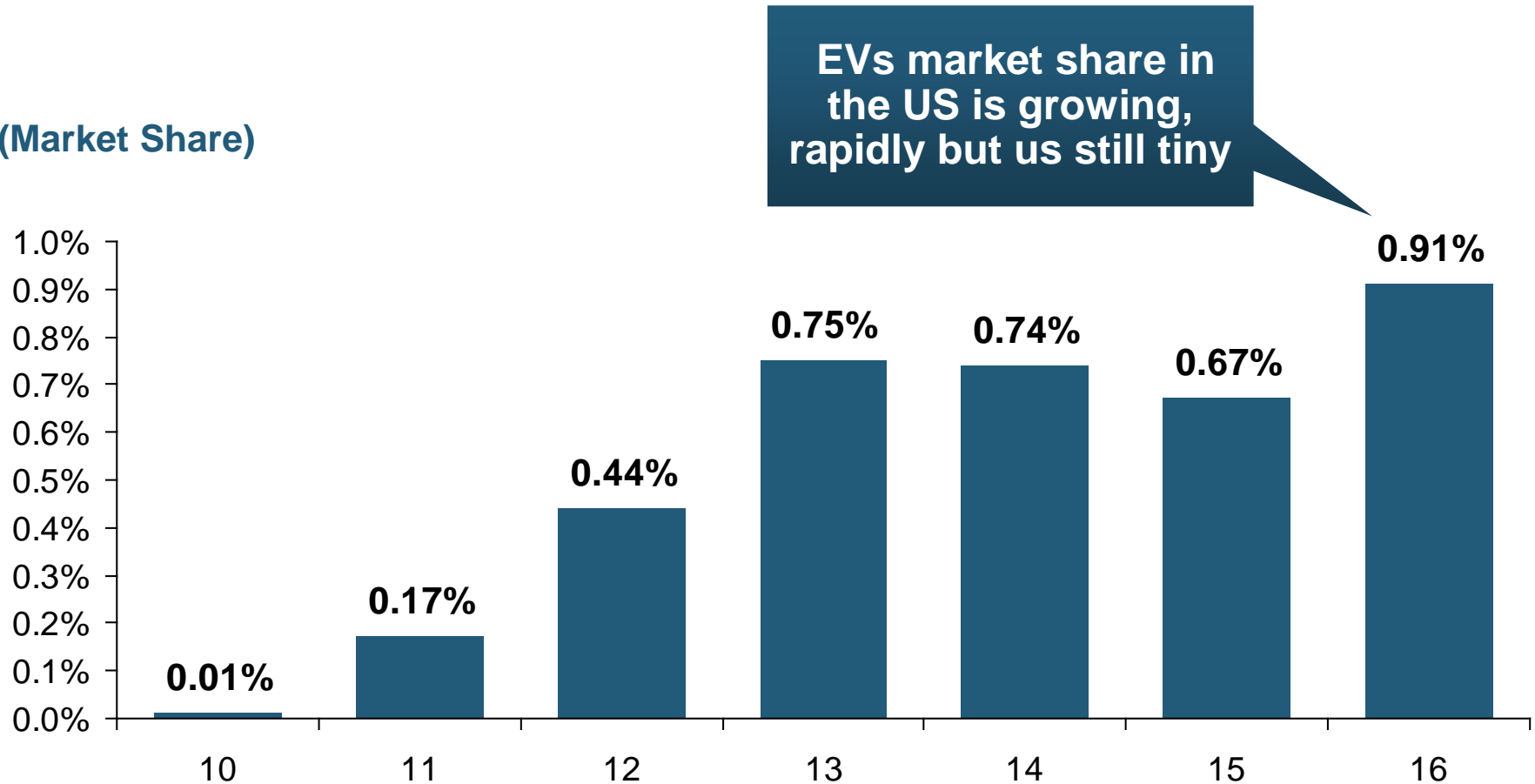
Source: International Energy Agency, 2017 Global Electric Vehicle Outlook accessed at:

<https://www.iea.org/publications/freepublications/publication/GlobalEVOutlook2017.pdf>; USC RUM.



# Electric Car Market Share in the US: 2010–2016\*

(Market Share)



\*Includes plug-in vehicles and hybrids.

Source: International Energy Agency, 2017 Global Electric Vehicle Outlook accessed at:

<https://www.iea.org/publications/freepublications/publication/GlobalEVOutlook2017.pdf>; USC RUM.



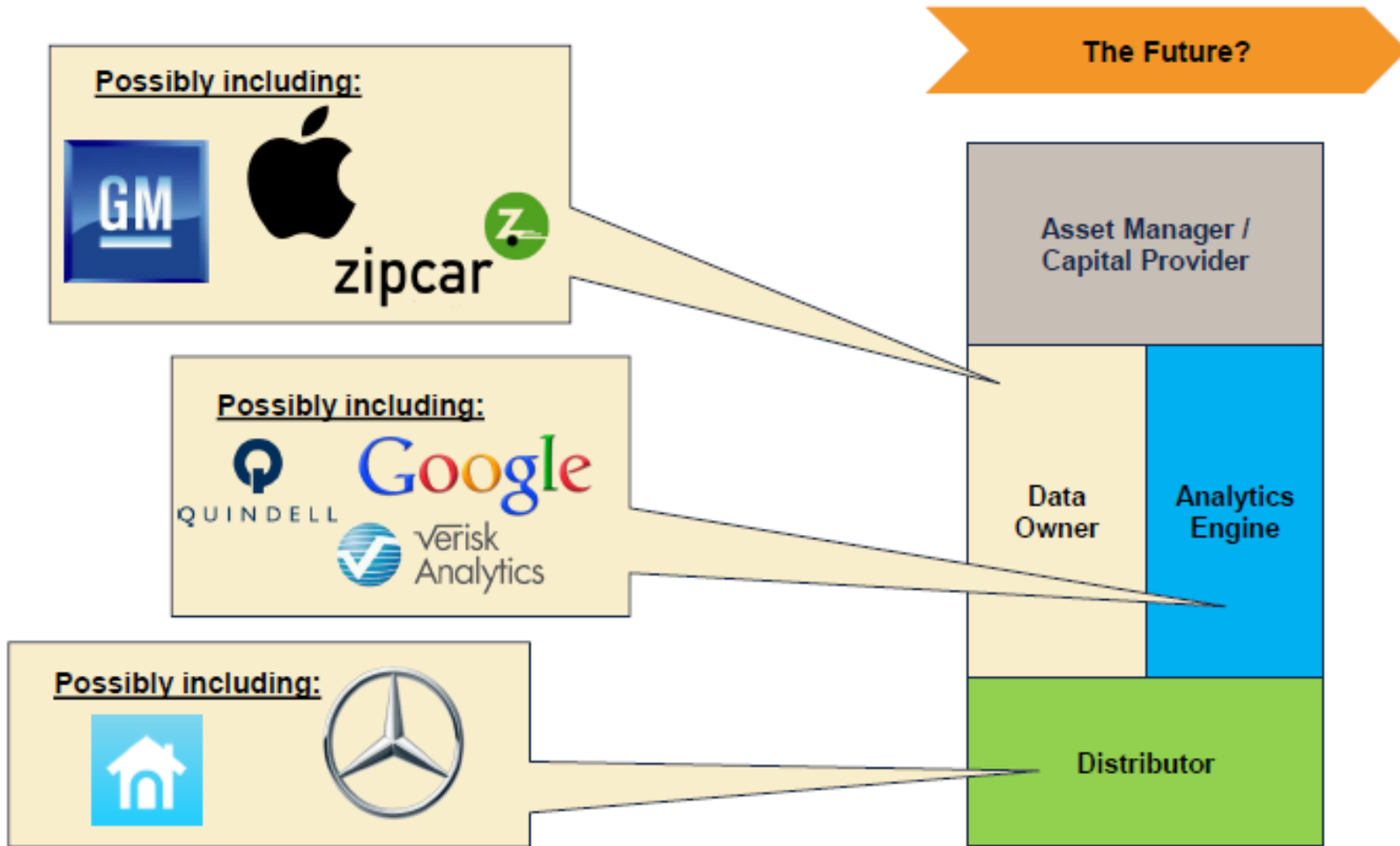
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# INDUSTRY DISRUPTORS

**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

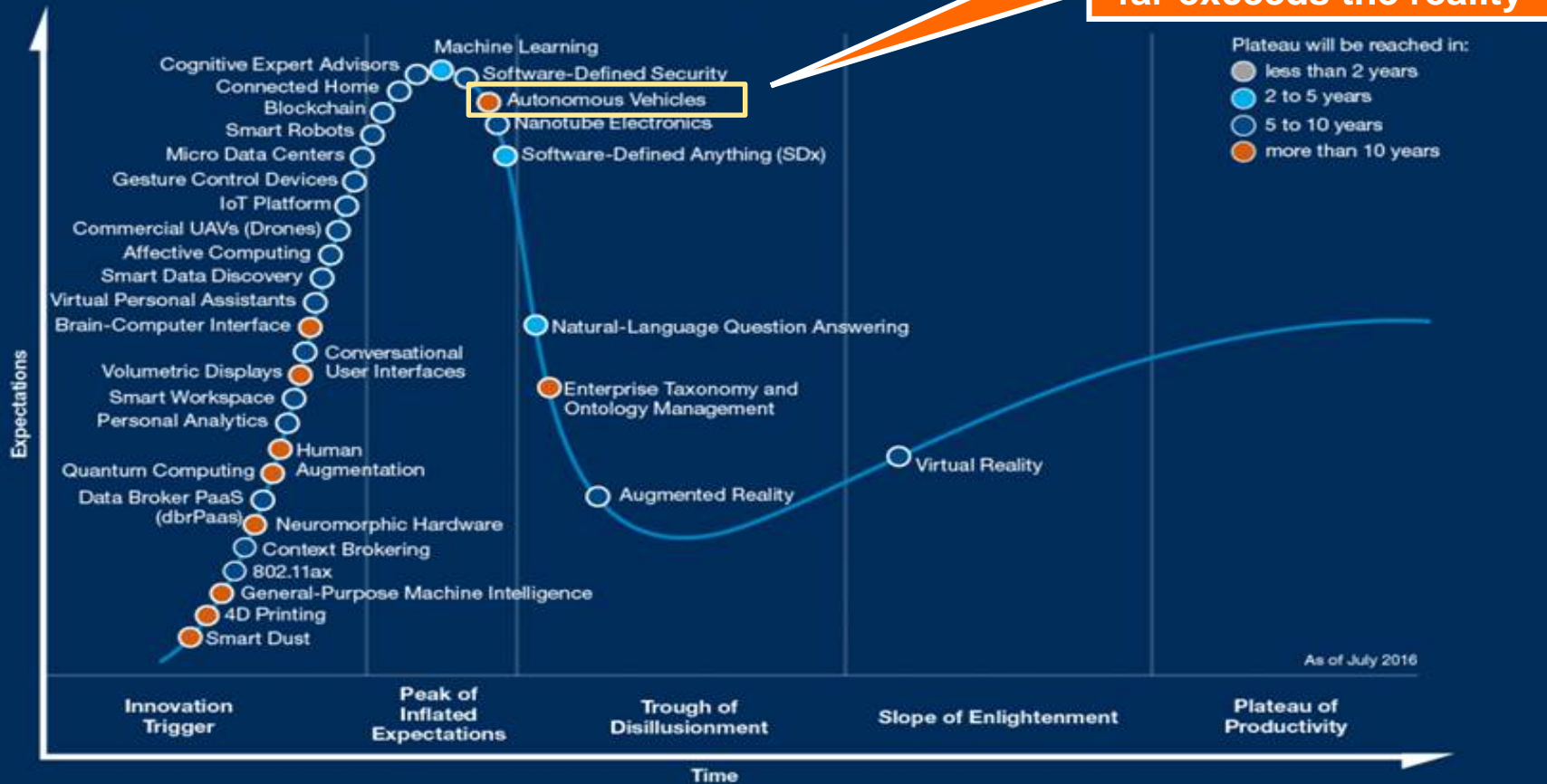


**Who owns the data? Where does it flow? Who does the analytics?  
Who is the capital provider?**

# The Sharing Economy Has Grown— And Attracted Political Scrutiny

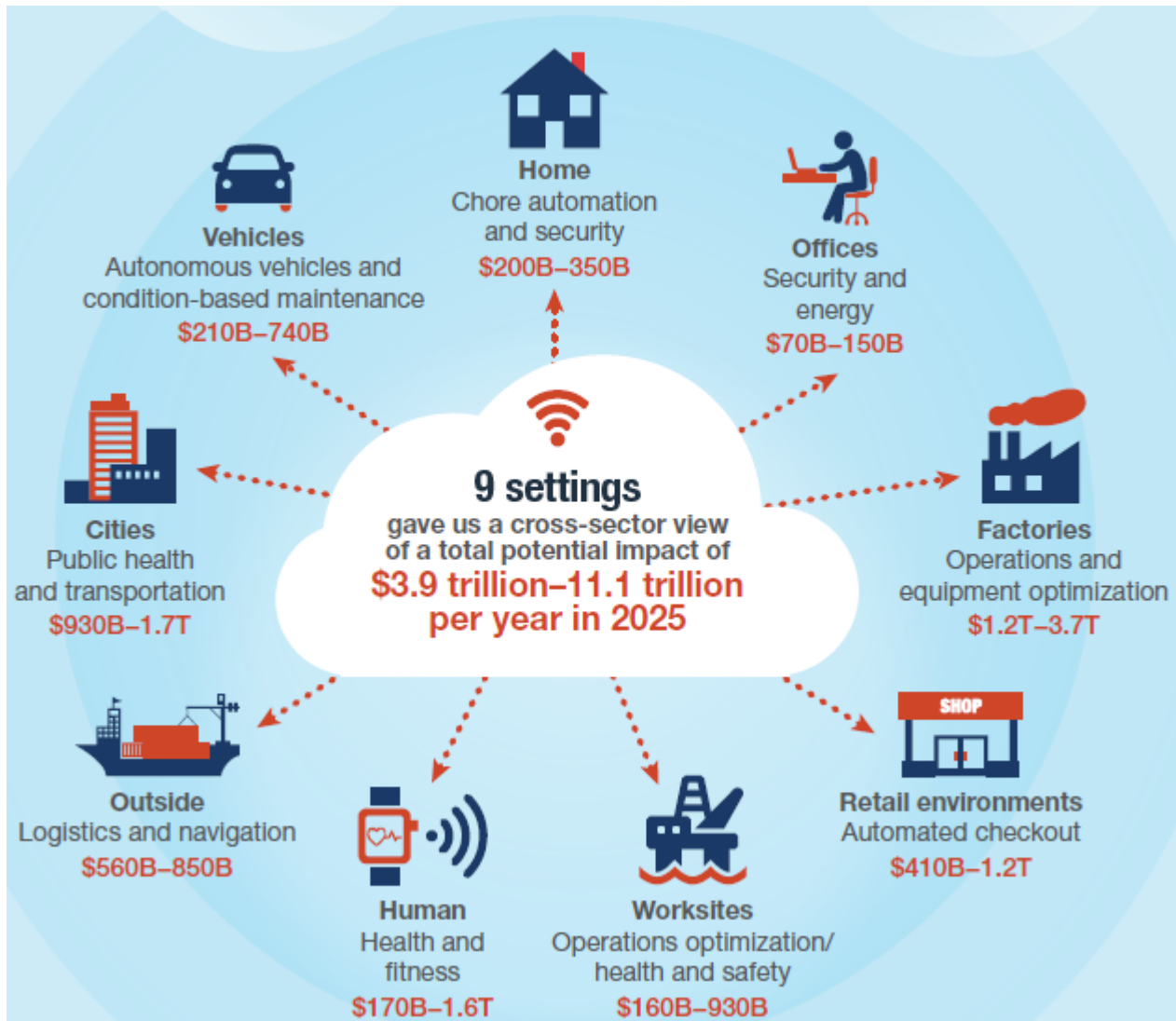
There's no question that the hype around autonomous vehicles far exceeds the reality

## Emerging Technology Hype Cycle for 2016



Source: Gartner  
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# The Internet of Things and the Insurance Industry



Sources: McKinsey Global Institute, *The Internet of Things: Mapping the Value Beyond the Hype*, June 2015; Insurance Information Institute.

- 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”?

# Media is Obsessed with Driverless Vehicles: Often Predicting the Demise of Auto Insurance

## Hands-Free

Projected global unit sales of autonomous vehicles over the next 20 years

32m

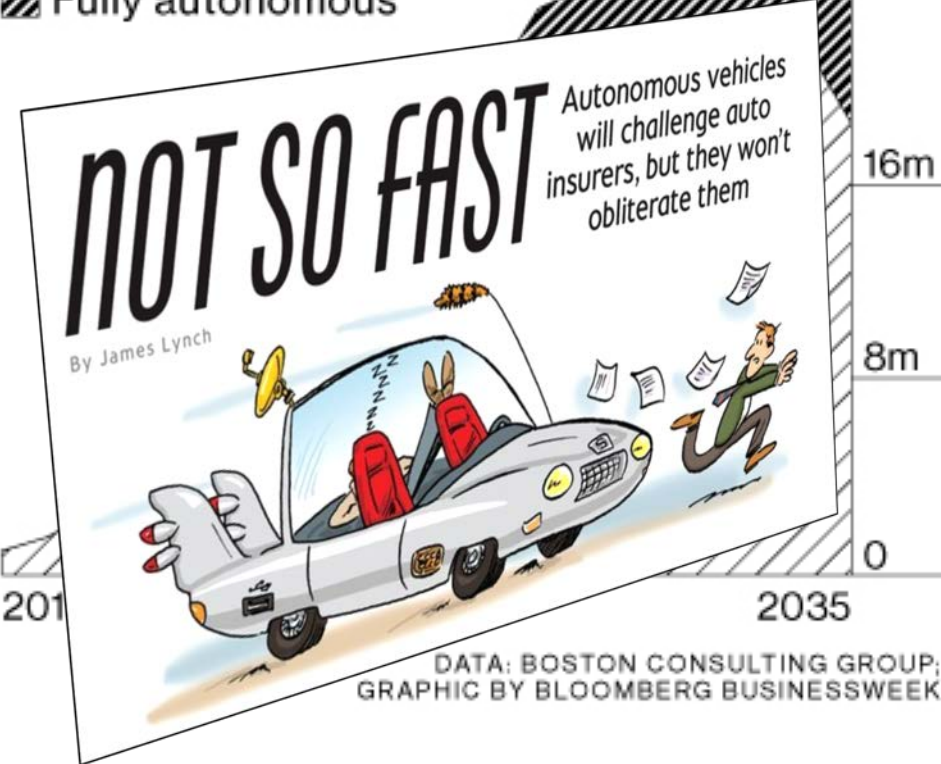
24m

16m

8m

0

- ▨ Partially autonomous
- ▨ Fully autonomous



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.

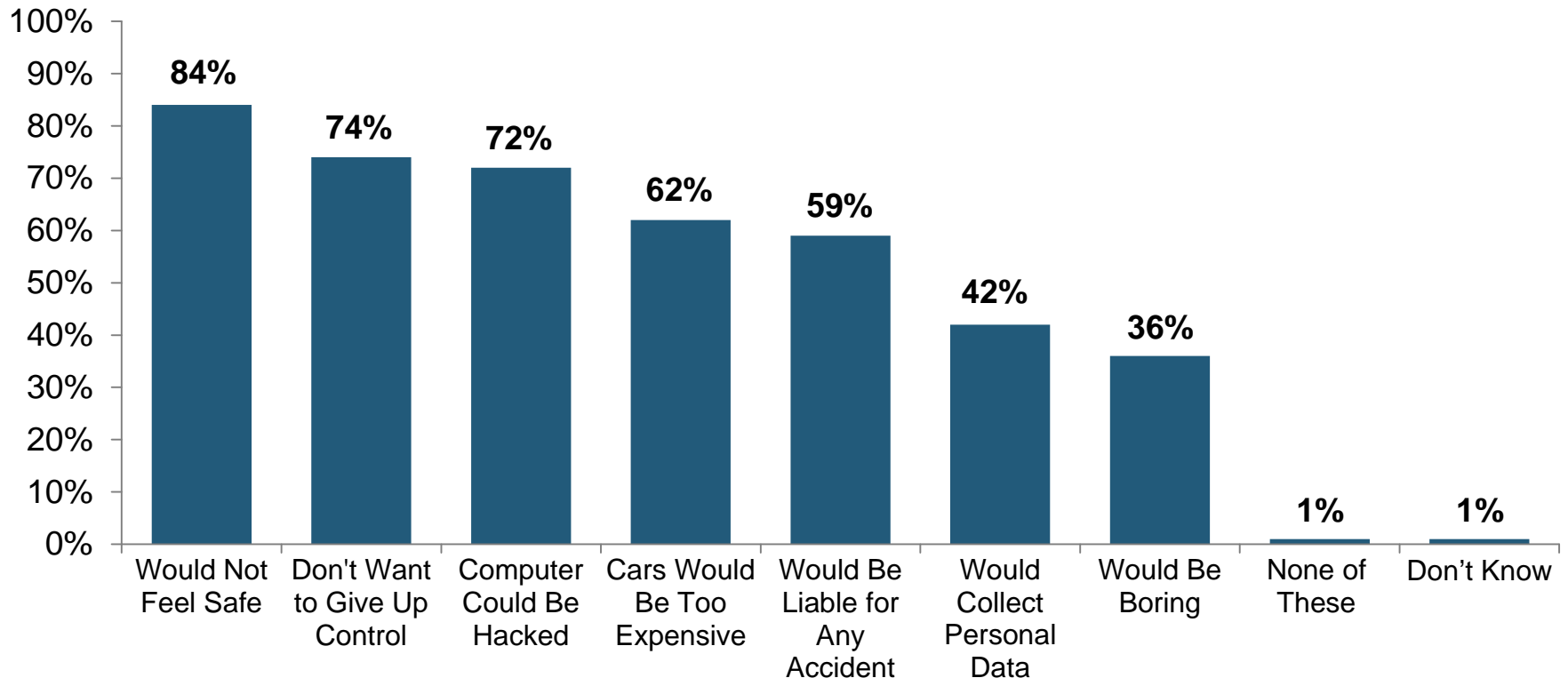
# A Few of the (Many) Technological Hurdles Facing Autonomous Vehicles

Tech Hurdle	Discussion of Problem
Inability to Operate Safely in All Weather Conditions	Heavy rain, snow, fog and compromise radar and lidar sensor technologies, requiring humans to intervene
Driving Safely Despite Unclear Lane Markings	Vehicle can have difficulty making guidance decisions when lines on roads are faint or absent.
Reliably Recognizing Traffic Lights that Are Not Working Properly	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)
Ability to Respond to Spoken Commands or Hand Signals from Law Enforcement, Highway Safety Employees, Construction Crews, Pedestrians, Cyclists, etc.	Verbal instructions, eye contact, hand signals, gesturing all play extremely important roles in driving, more so than is generally appreciated or understood.



# I.I.I. Poll: Driverless Cars

## Why Americans Would Not Want to Ride in a Driverless Car, May 2016<sup>1</sup>



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

<sup>1</sup> 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?

**Drive without worry**

All vehicles at Canvas come with maintenance, insurance, warranty, roadside assistance, and registration. We're trying to make the car experience that much simpler. **No need to go out and find different quotes, talk to insurance agents, etc.**

**Insurance**

All cars at Canvas come with insurance included. What does this mean for you? Your car comes ready to roll with things like: commercial auto liability, renter's limit endorsement, state financial responsibility, personal injury protection, rental reimbursements, towing coverage, and more.

[Learn More](#)

**Maintenance & Warranty**

All of our cars come with maintenance and extended warranty packages. More specifically, this means you'll get the extended warranty benefits that come with Ford's PremiumCARE Extended Service and maintenance benefits that come with Ford's Protect Premium Maintenance Plan.

[Learn More](#)

- **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**

# 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**

**canvas**

**Ready-to-drive cars.**

Our cars come with insurance and the following benefits:

- ✓ Comprehensive maintenance and warranty
- ✓ No registration fees
- ✓ Flexible mileage packages
- ✓ Unused miles roll over
- ✓ Ultimate peace of mind

[Learn more about our cars and coverage](#)

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

**Insurers are partnering with US car subscription and sharing programs**  
US-only programs, data as of February 2, 2018

Automakers	AAA	ASSURANT*	CHUBB ESIS®	HAMILTON	Liberty Mutual
	ReachNow				
	BOOK BY ENZO				
	canvas				
	MAVEN				
	PASSPORT				
	CARE				
Non-automakers / Startups					
	GIG				
	FLEXDRIVE				
	fair				
	TURO				
	CARMA				

Graphic is illustrative, not exhaustive

CBINSIGHTS

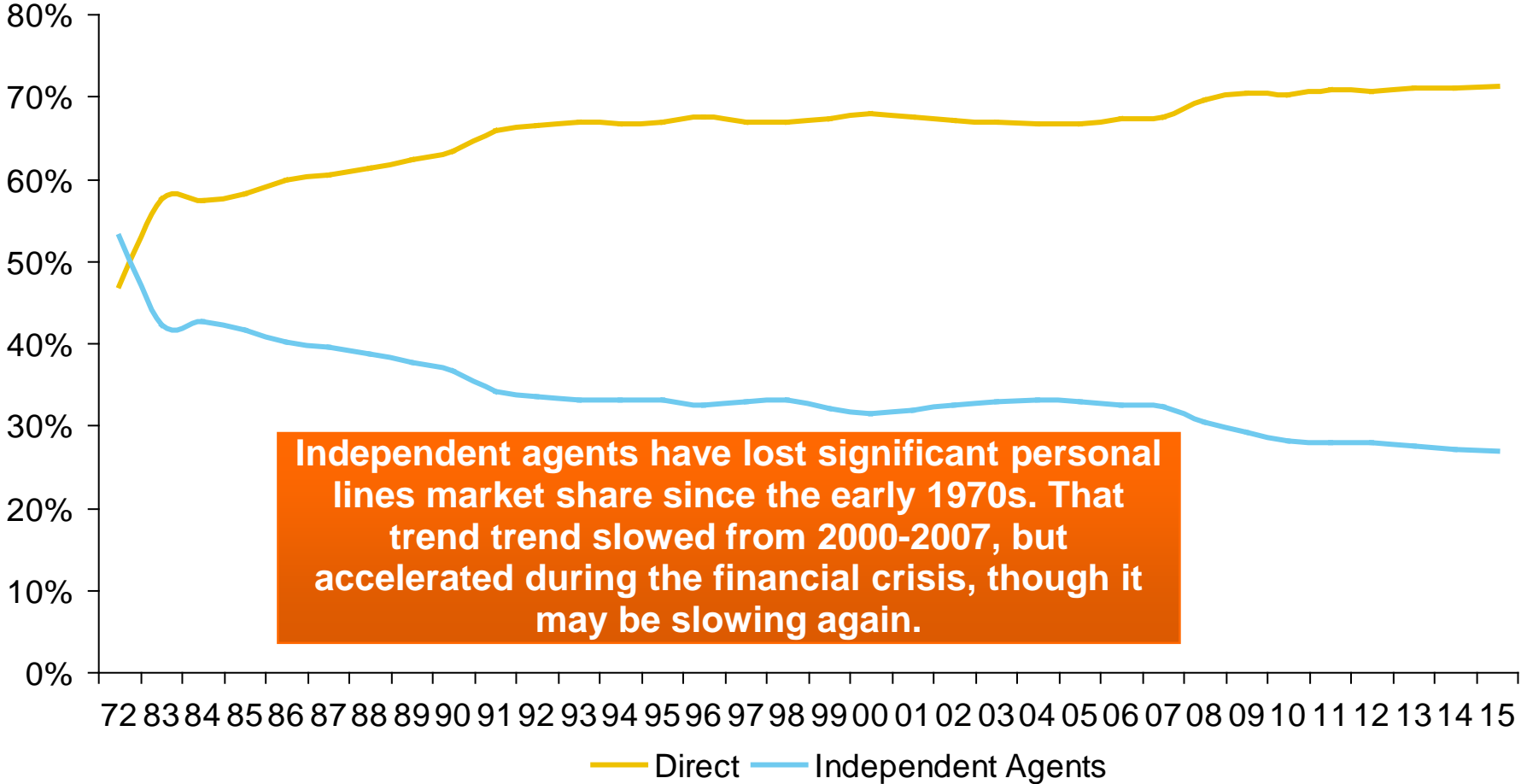
The car subscription service is tiny—and how much it will grow is uncertain;

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)

# Distribution Trends

**Distribution by Channel Type  
Continues to Evolve Around  
the World**

# Personal Lines Distribution Channels, Direct vs. Independent Agents, 1972-2015



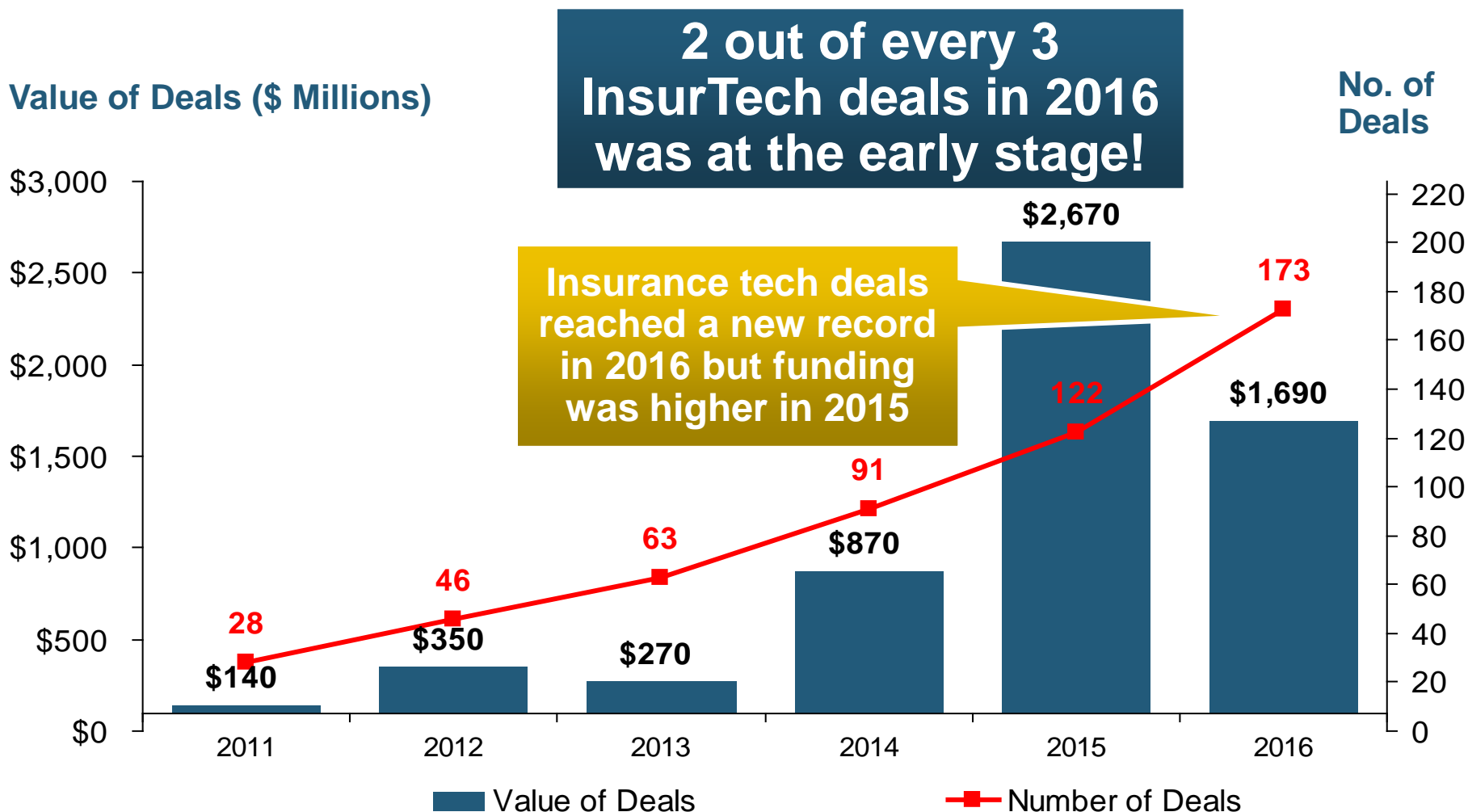
Source: Insurance Information Institute; based on data from Conning and A.M. Best.

# **INSURANCE TECHNOLOGY: *FIN TECH ZEROES IN***

**Number and Value of Deals Is Increasing**

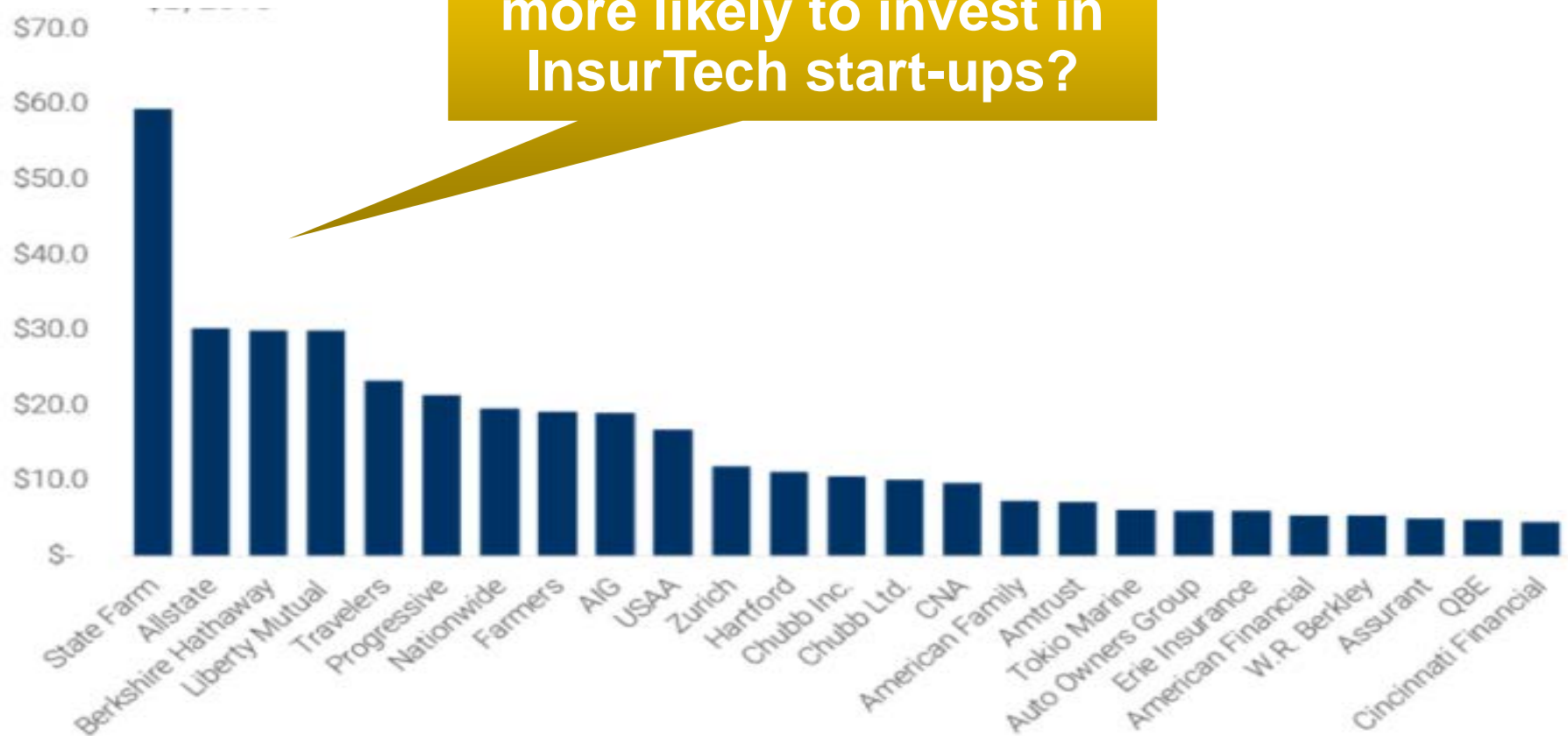
***An Industry that Has Always Been Accepting  
of Change and Innovation***

# InsurTech Annual Financing, 2011 – 2016



# Top 25 P/C Insurers by Direct Written Premium, 2015

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

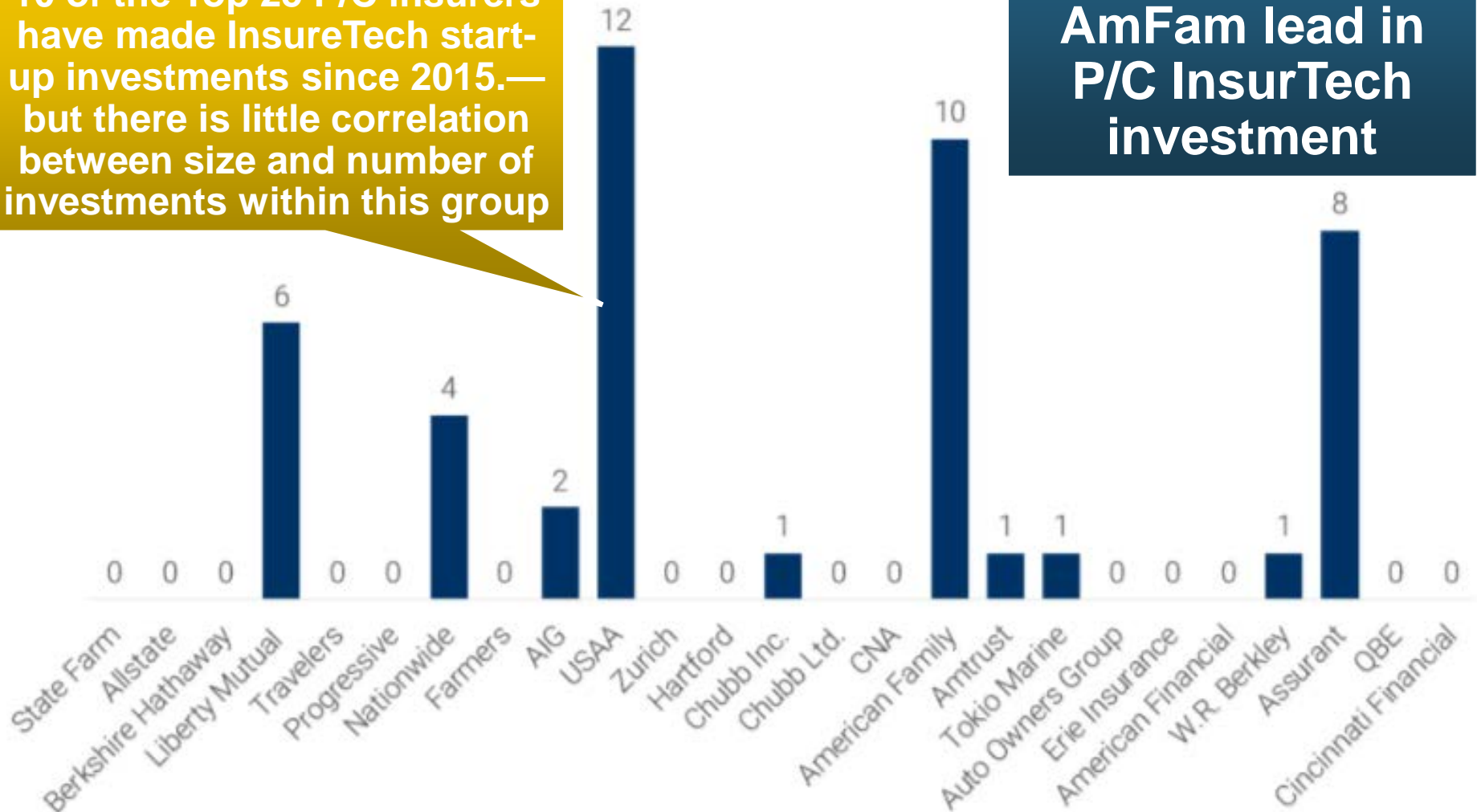




# Start-Up InsurTech Investments by Top 25 P/C Insurers, 2015 - 2017\*

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/>



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*Thank you for your time  
and your attention!*

*Twitter: [twitter.com/bob\\_hartwig](https://twitter.com/bob_hartwig)*

*For a copy of this presentation, email  
me at [robert.hartwig@moore.sc.edu](mailto:robert.hartwig@moore.sc.edu)*