



# Inflation From All Angles

**Southwest Actuarial Forum  
San Antonio, TX  
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**Download at [www.iii.org/presentations](http://www.iii.org/presentations)**

James Lynch, FCAS MAAA, chief actuary

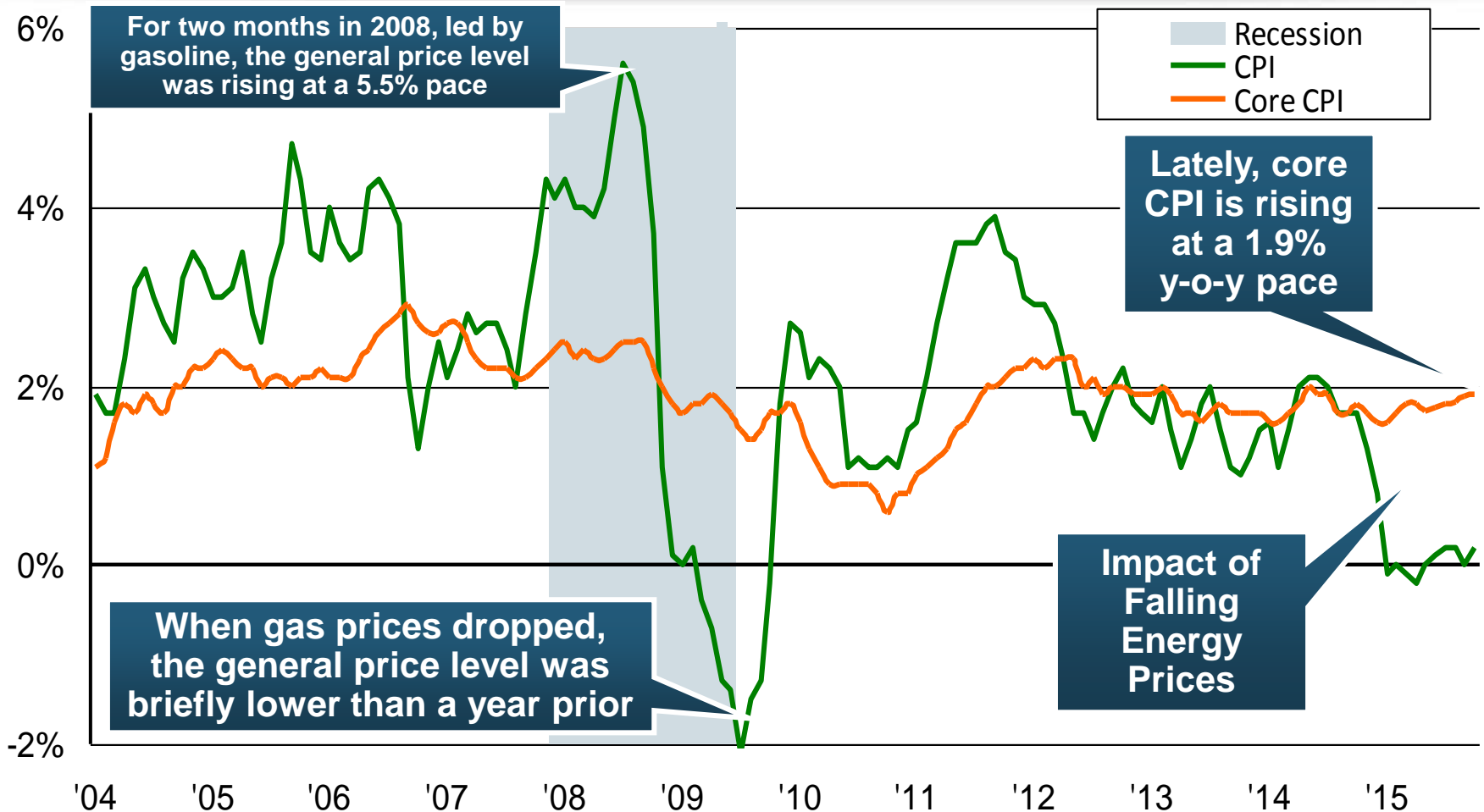
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- Inflation is Low and Likely to Stay That Way
- Low Yields Are Built Into P/C Investment, Pricing Strategy
- Severity Inevitably Outstrips Inflation
- Severity Has Been Abnormally Low But Is Returning to Long-Term Tendency
- Frequency Is Rising, Breaking Decadeslong Tendency
- Important Pricing/Reserving Implications

# Inflation? What Inflation?

# Change\* in the Consumer Price Index, 2004-2015



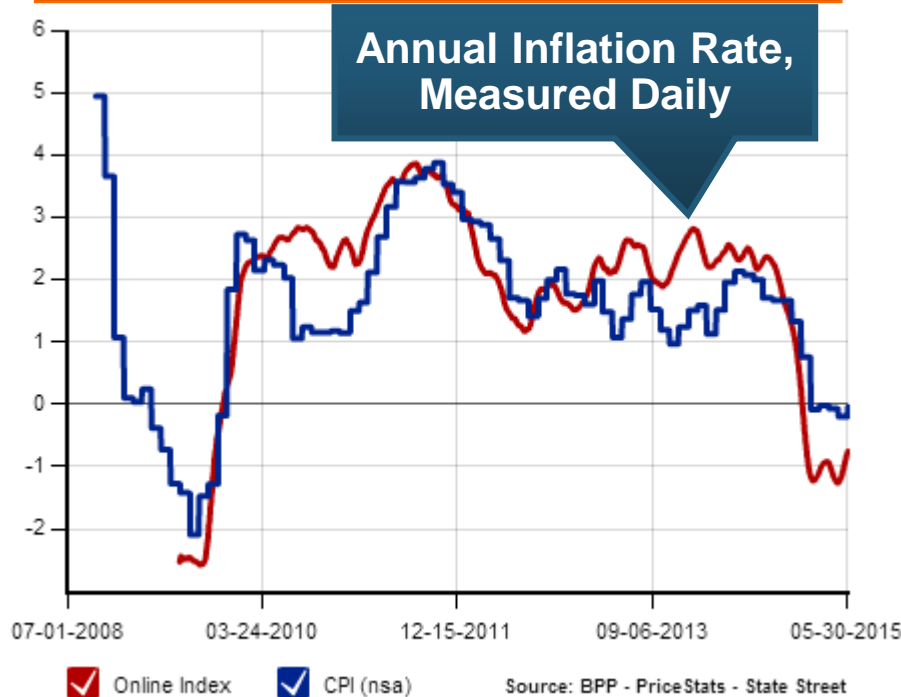
**Over the last decade, prices generally rose about 2% per year.**

\*Monthly, year-over-year, through October 2015. Not seasonally adjusted.

Sources: U.S. Bureau of Labor Statistics; National Bureau of Economic Research (recession dates); Insurance Information Institute.

# The “Billion Prices” Project Tracks **Daily** Price Changes for Internet Purchases

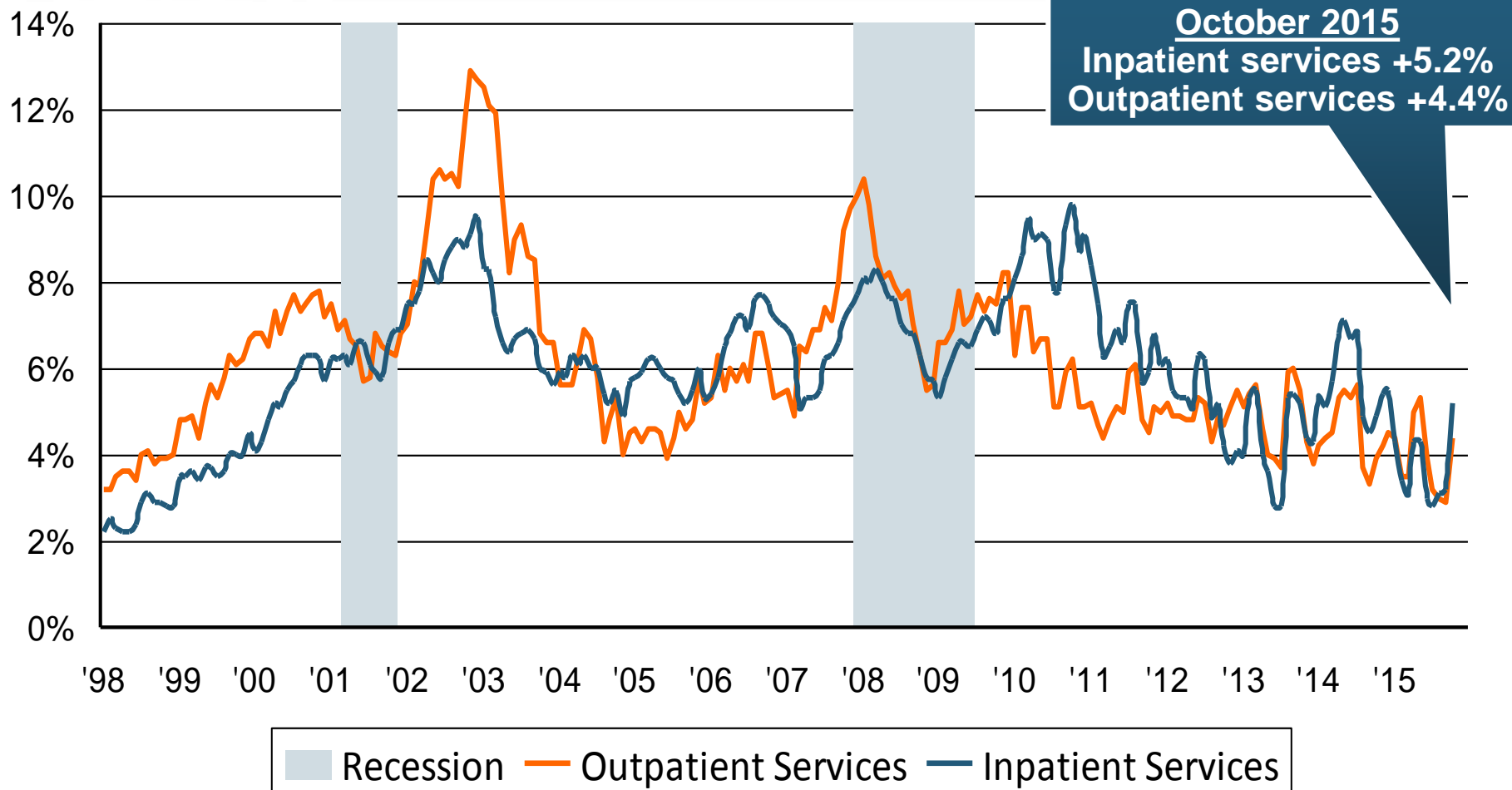
## Independent Data Series Tracks CPI Closely



- Data Collected Daily from Online Retailers
- Includes Product Descriptions, Package Sizes, Brands
- Tracks Whether Item is On Sale
- (Publicly Available Data Lagged Several Months)

# Should We Focus on Price Changes in a More Granular Way?

# Prices for Hospital Services: 12-Month Change,\* 1998–2015



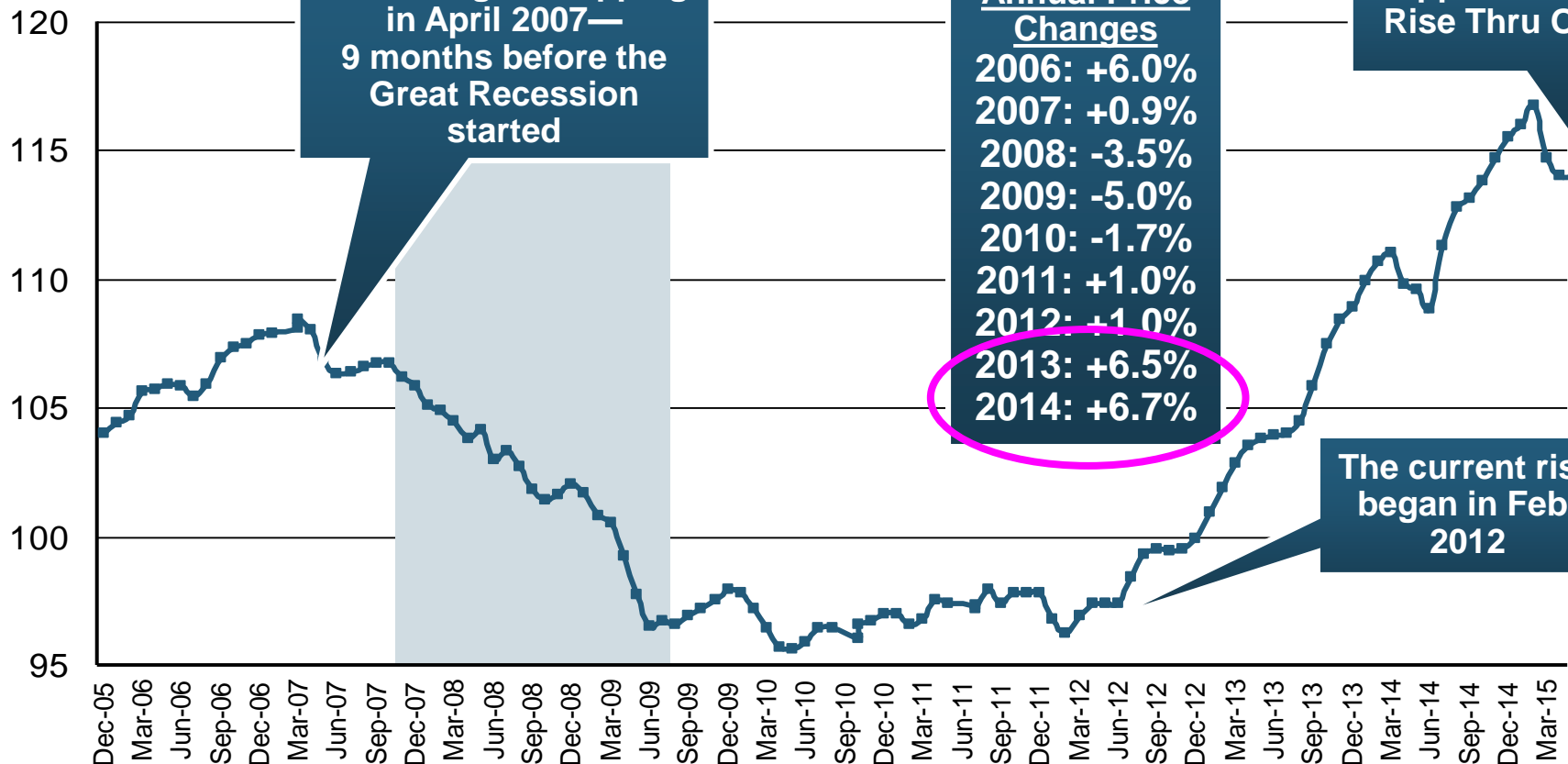
**Prices for Hospital Services have risen at an annual rate of 4% or more for the last 15 years, while the general price level rose by 2%/year.**

\*Percentage change from same month in prior year; through October 2015; seasonally adjusted

Sources: US Bureau of Labor Statistics; National Bureau of Economic Research (recession dates); Insurance Information Institute.

# Constant Quality Price Index for Single Family Houses Under Construction, Monthly, 2006-2015

Price Index,  
Jan. 2005 = 100

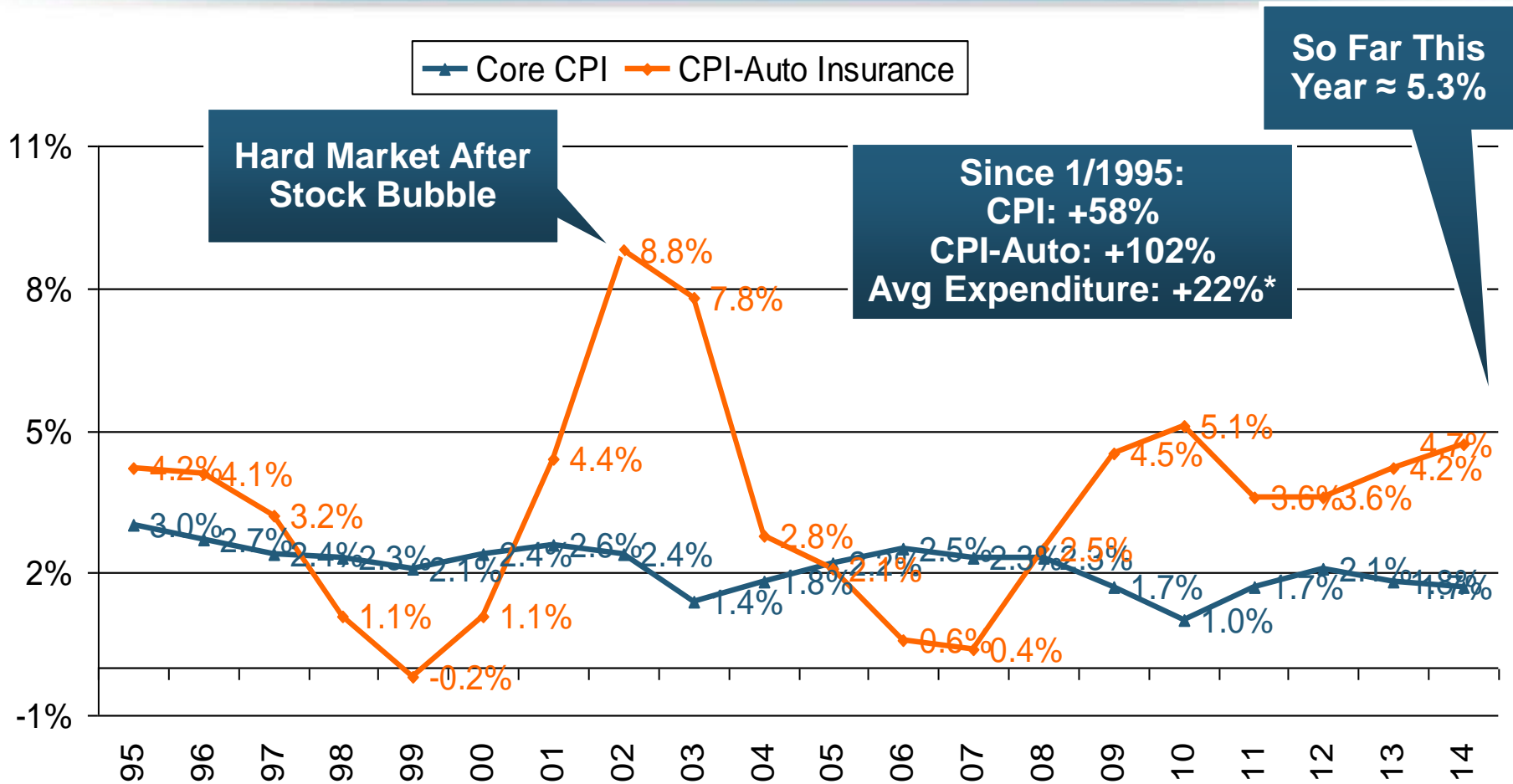


**Index Addresses: "How much is the sales price today for the same quality house as in the base year?"**

Note: Recession indicated by gray shaded column. Price changes in 2015 are preliminary  
Sources: Census Bureau at <https://www.census.gov/construction/cpi/>; NBER (recession dates); I.I.I.



# Auto Insurance Inflation vs. Core CPI, 1995-2014



**Reasons for the Inflation-Expenditure Gap: Higher Deductibles, Lower Limits, Fewer Buying Optional Coverages? More Shopping?**

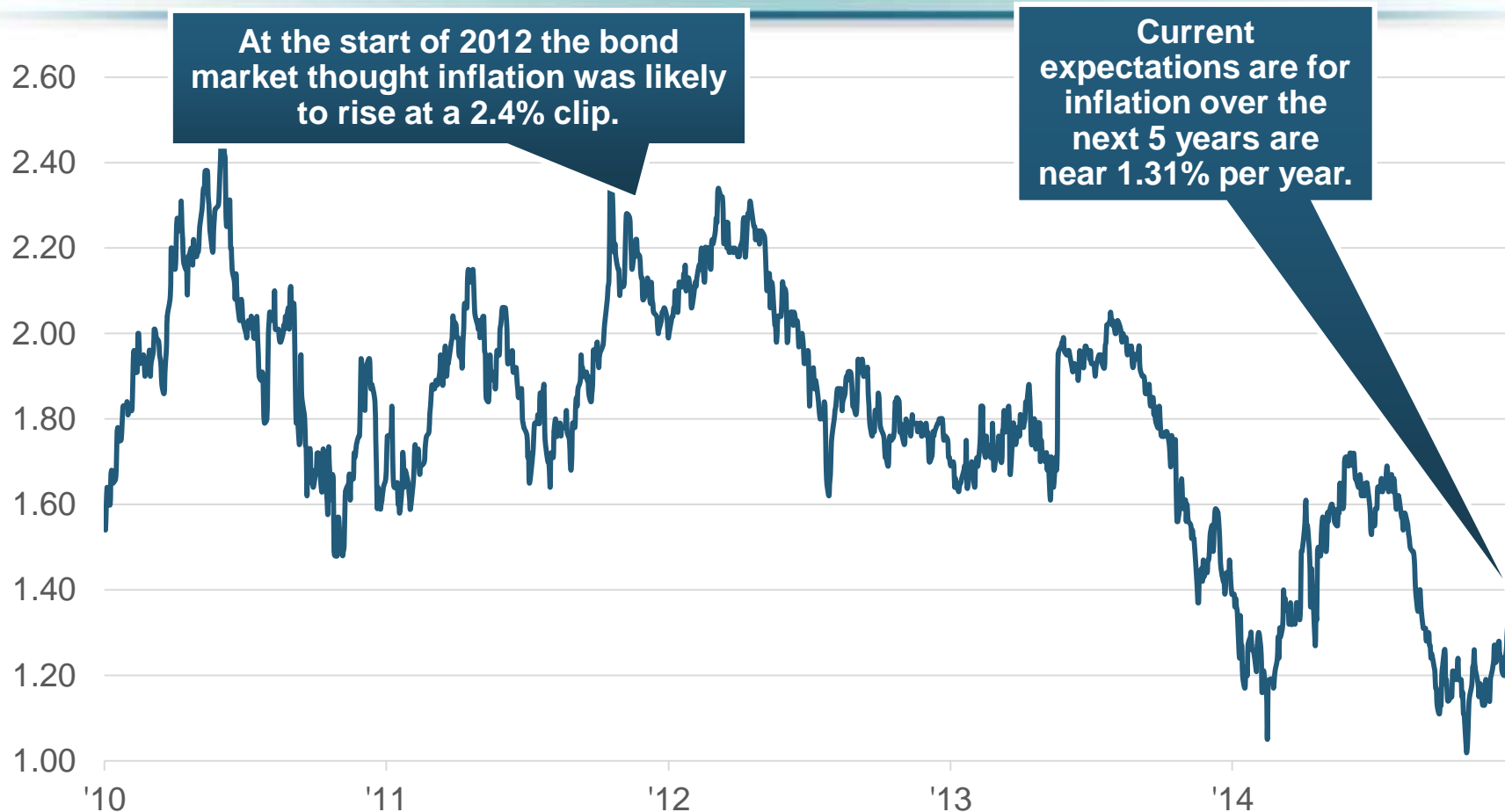
\* Through 2012.

Sources: Bureau of Labor Statistics, National Association of Insurance Commissioners,

Actuarial Review: [http://www.actuarialreview-digital.org/actuarialreview/september\\_october\\_2014#pg27](http://www.actuarialreview-digital.org/actuarialreview/september_october_2014#pg27).

# What Does the Future Hold?

# The Bond Market's Recent\* Expectation of U.S. Inflation in the Next Five Years

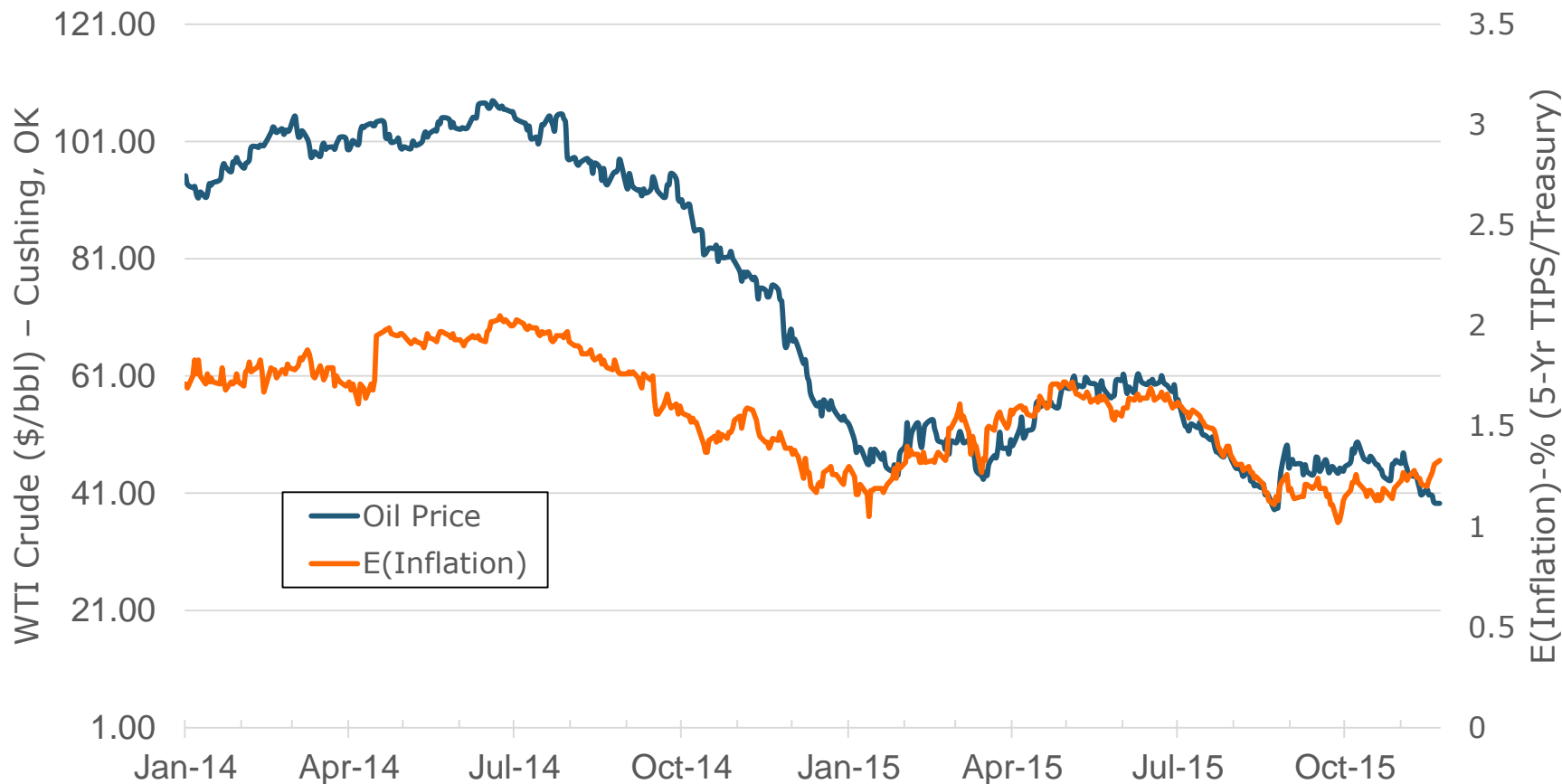


The chart was derived by subtracting the TIPS 5-year yield (which has no inflation component) from the yield for the 5-year U.S. Treasury note (which, at least in theory, includes anticipated inflation).

\* As of November 27.

Source: St. Louis Fed (FRED) <https://research.stlouisfed.org/fred2/series/T5YIE#>; Insurance Information Institute.

# Since We Are in Texas . . .

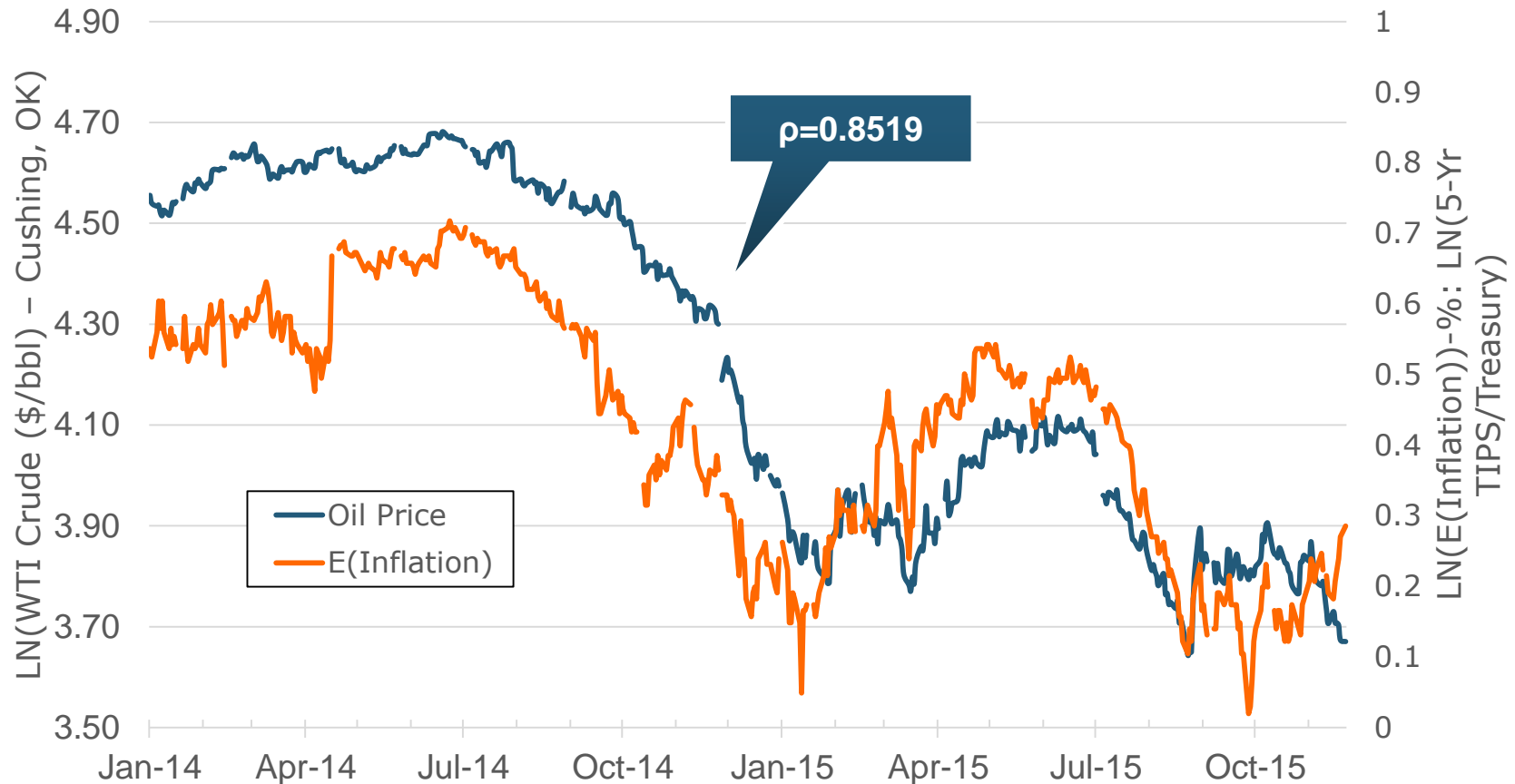


**Since January 2014, Inflation Expectations Have Closely Followed the Price of Oil (or Vice Versa).**

Data as of November 23.

Source: St. Louis Fed (FRED) <https://research.stlouisfed.org/fred2/graph/?g=1433#>, Insurance Information Institute.

# Since We Are ACTUARIES in Texas . . .



**Since January 2014, Natural Log of Inflation Expectations Has Closely Followed the Natural Log of Price of Oil (or Vice Versa).**

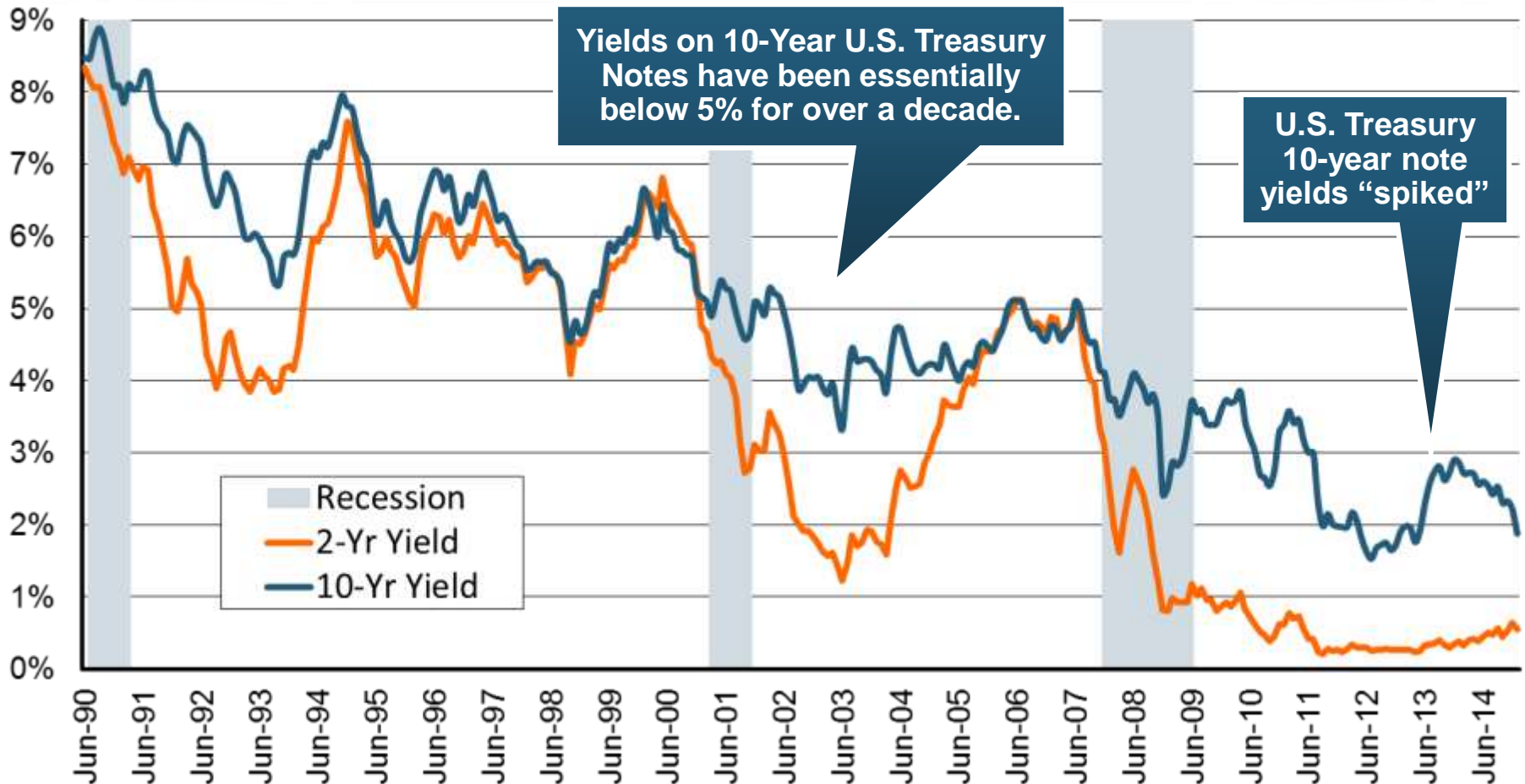
Data as of November 23.

Source: St. Louis Fed (FRED) <https://research.stlouisfed.org/fred2/graph/?g=1433#>, Insurance Information Institute.

# Inflation and P/C Insurer Investments

**If Expected Inflation Remains Low,  
Will Bond Yields Be Mired at Levels  
Last Seen in the 1950s?**

# U.S. Treasury 2- and 10-Year Note Yields\*: Monthly, 1990–2015

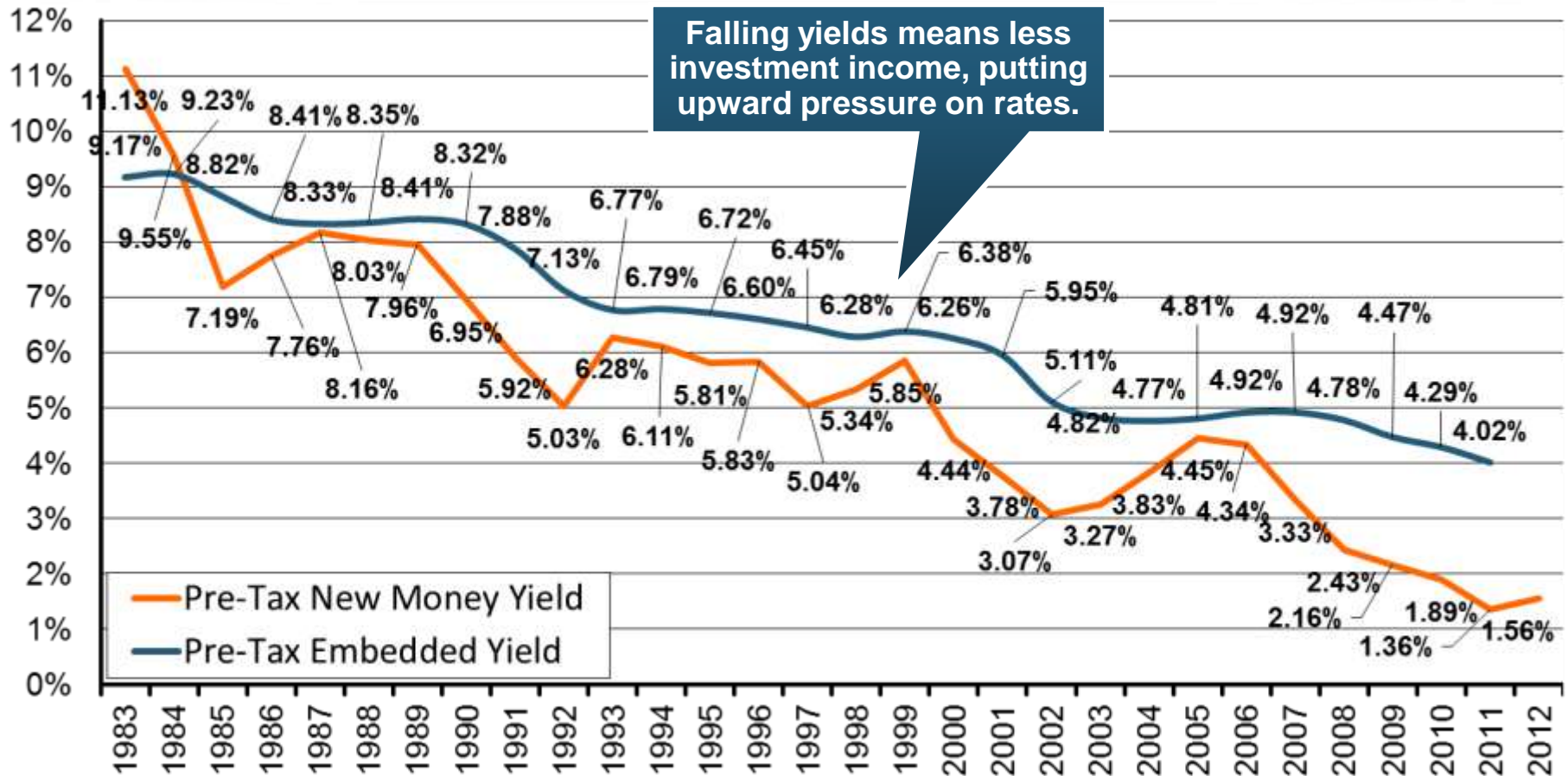


**Since roughly 80% of P/C bond/cash investments are in 10-year or shorter durations, most P/C insurer portfolios will have low-yielding bonds for years to come.**

\*Monthly, constant maturity, nominal rates, through January 2015.

Sources: Federal Reserve Bank at <http://www.federalreserve.gov/releases/h15/data.htm>.  
National Bureau of Economic Research (recession dates); Insurance Information Institutes.

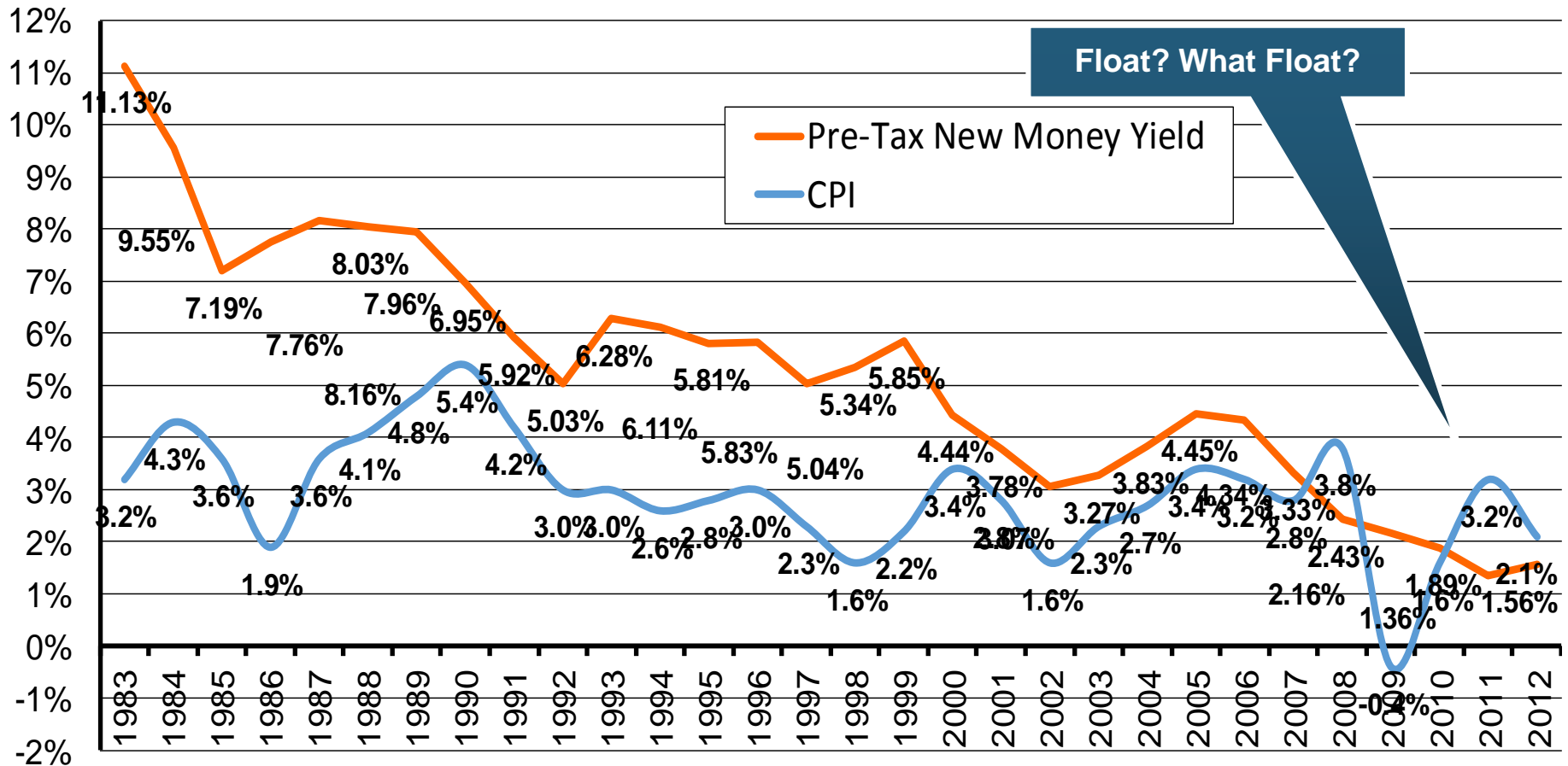
# New Money vs. Embedded Yields, U.S. Insurers, 1983-2012



**As long as new money rates are below the rates of maturing bonds, the portfolio yield will continue to sink.**



# U.S. P/C Insurers, New Money Rate vs. CPI, 1983-2012

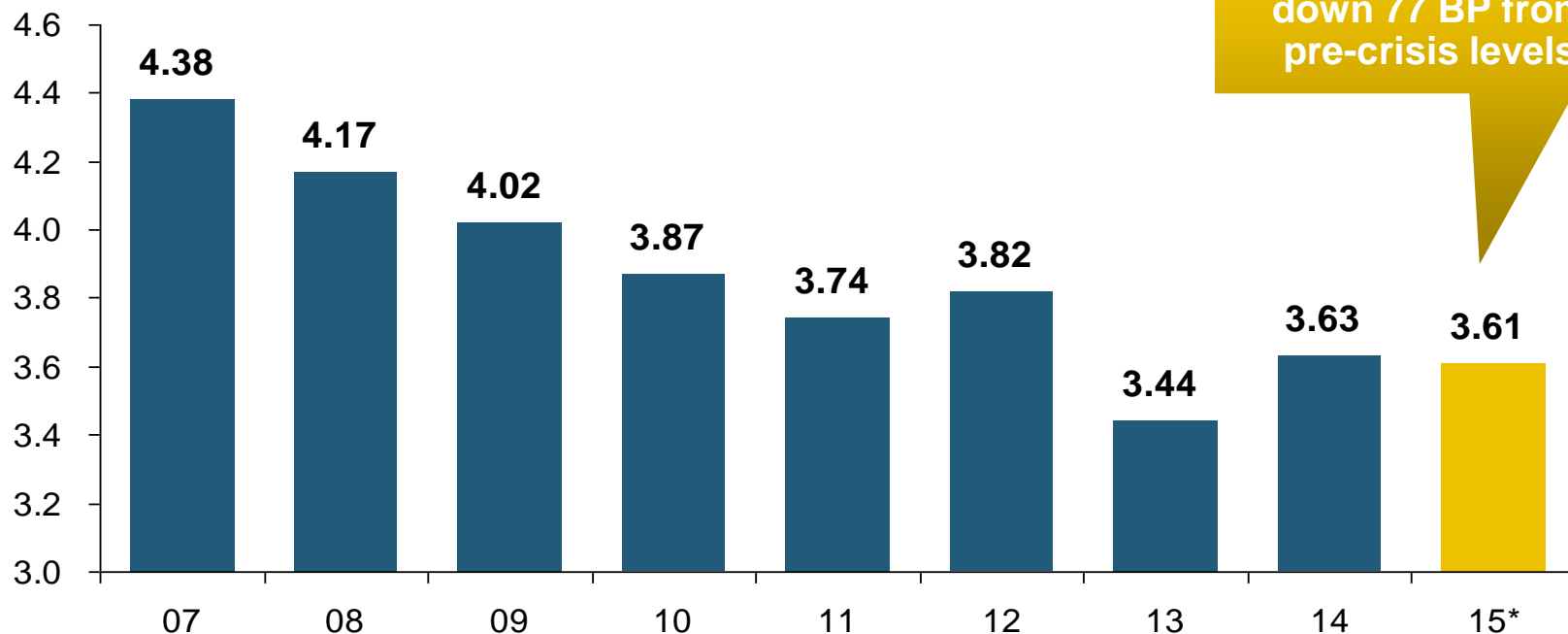


Float? What Float?

**If New Money Yields  $\leq$  Inflation, Where Is the Insurance Float?**

# Net Yield on Property/Casualty Insurance Invested Assets, 2007–2015\*

(Percent)



The yield on invested assets remains low relative to pre-crisis yields. The Fed's plan to raise interest rates in late 2015 has already pushed up some yields, albeit quite modestly.

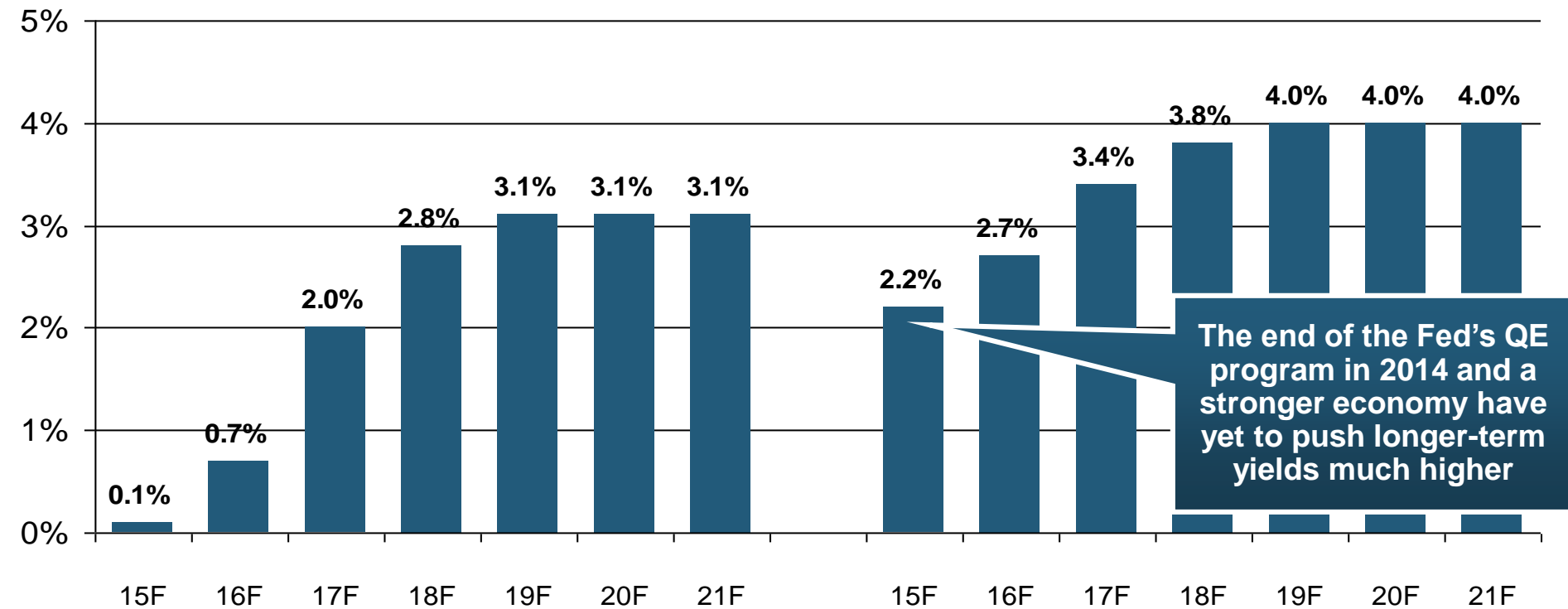
\*2015 figure is the average of the four quarters ending in 2015:Q2.  
Sources: SNL Financial; Insurance Information Institute

# Interest Rate Forecasts: 2015 – 2021

Yield (%)

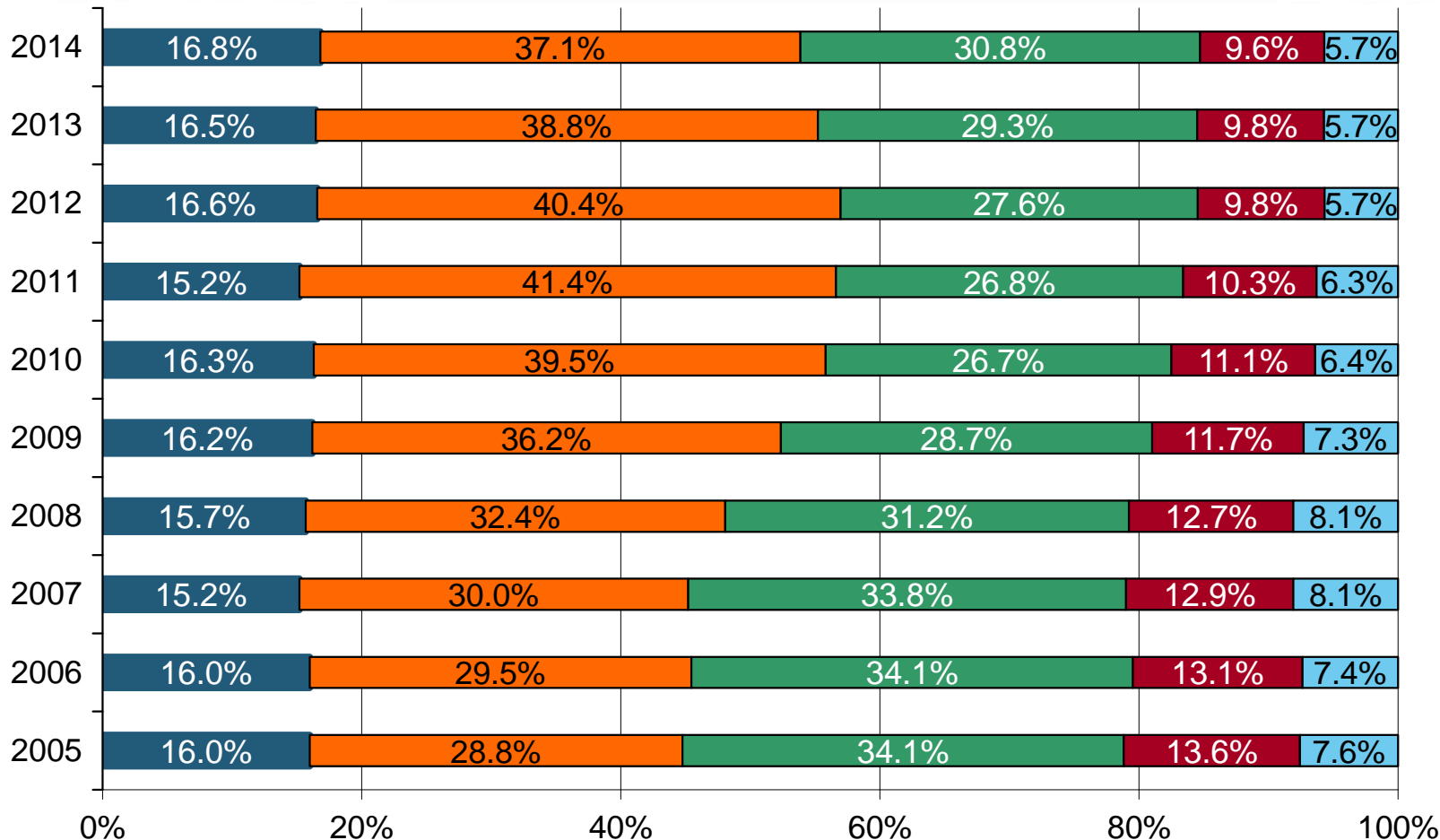
## 3-Month Treasury

## 10-Year Treasury



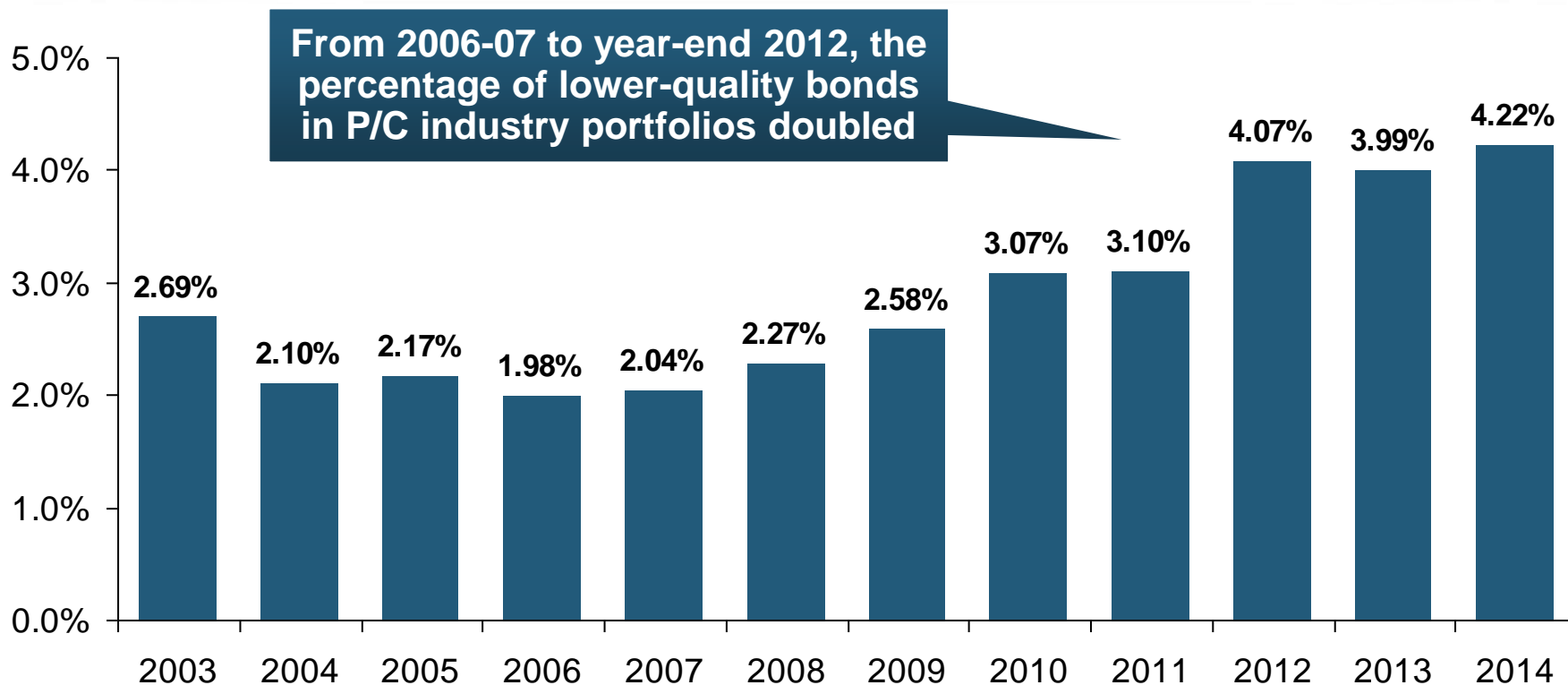
**A full normalization of interest rates is unlikely until the 2020s, more than a decade after the onset of the financial crisis.**

# Distribution of Bond Maturities, P/C Insurance Industry, 2005-2014



The main shift over these years has been from longer maturities to shorter maturities, but the 2013-14 data suggest a shift back has begun. The 2014 distribution resembles that at year-end 2009.

# Bonds Rated NAIC Quality Category 3-6 as a Percent of Total Bonds, 2003–2014



There are many ways to capture higher yields on bond portfolios. One is to accept greater risk, as measured by NAIC bond ratings. The ratings range from 1 to 6, with the highest quality rated 1. Even in 2014, over 95% of the industry's bonds were rated 1 or 2.

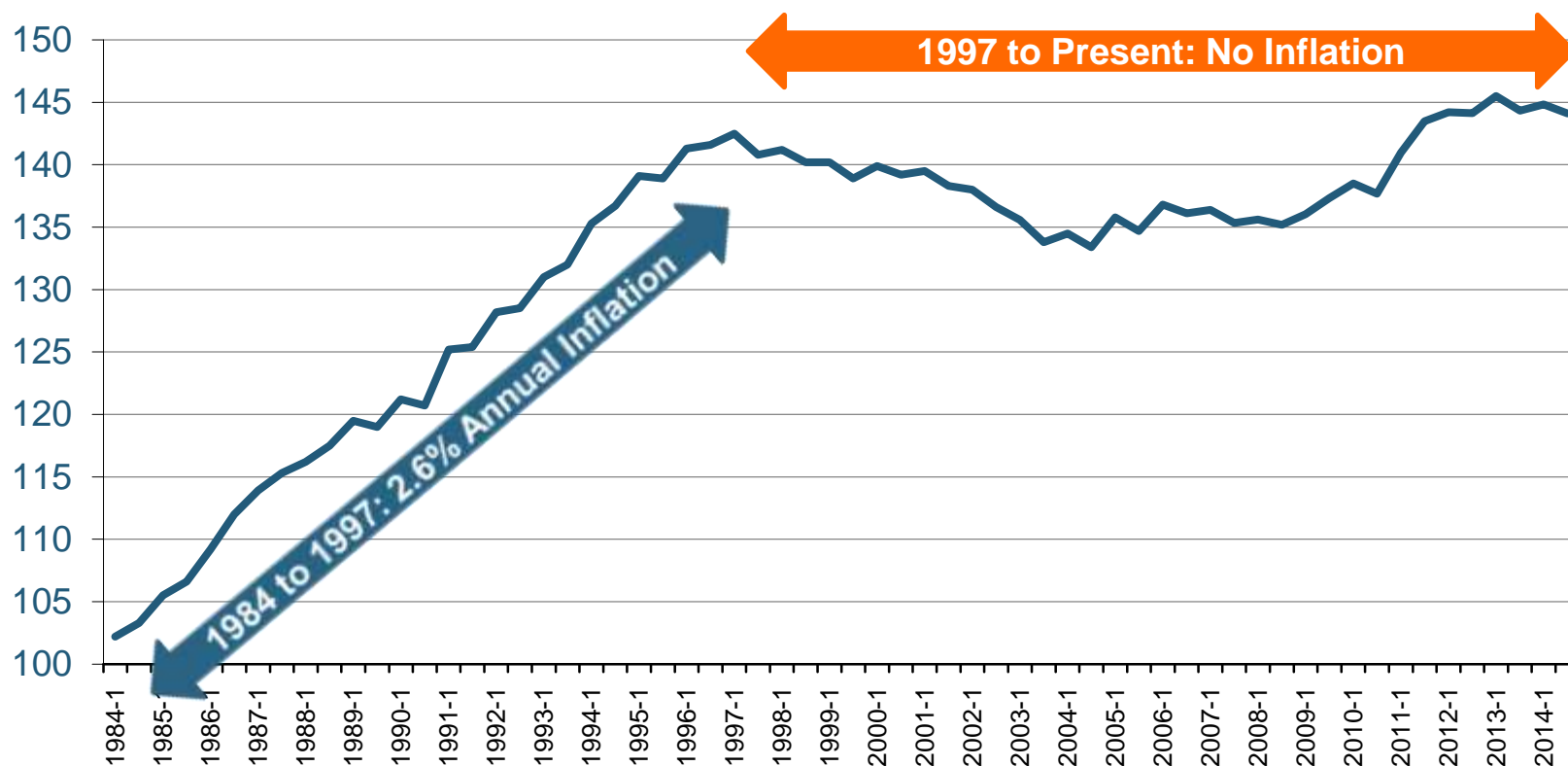
Sources: SNL Financial; Insurance Information Institute.

# What Inflation Doesn't Measure

***The Idea:  
Trend  $\geq$  Inflation  
(And Always Will Be)***

# Case Study: Inflation in Auto Prices

## CPI-U: New Cars



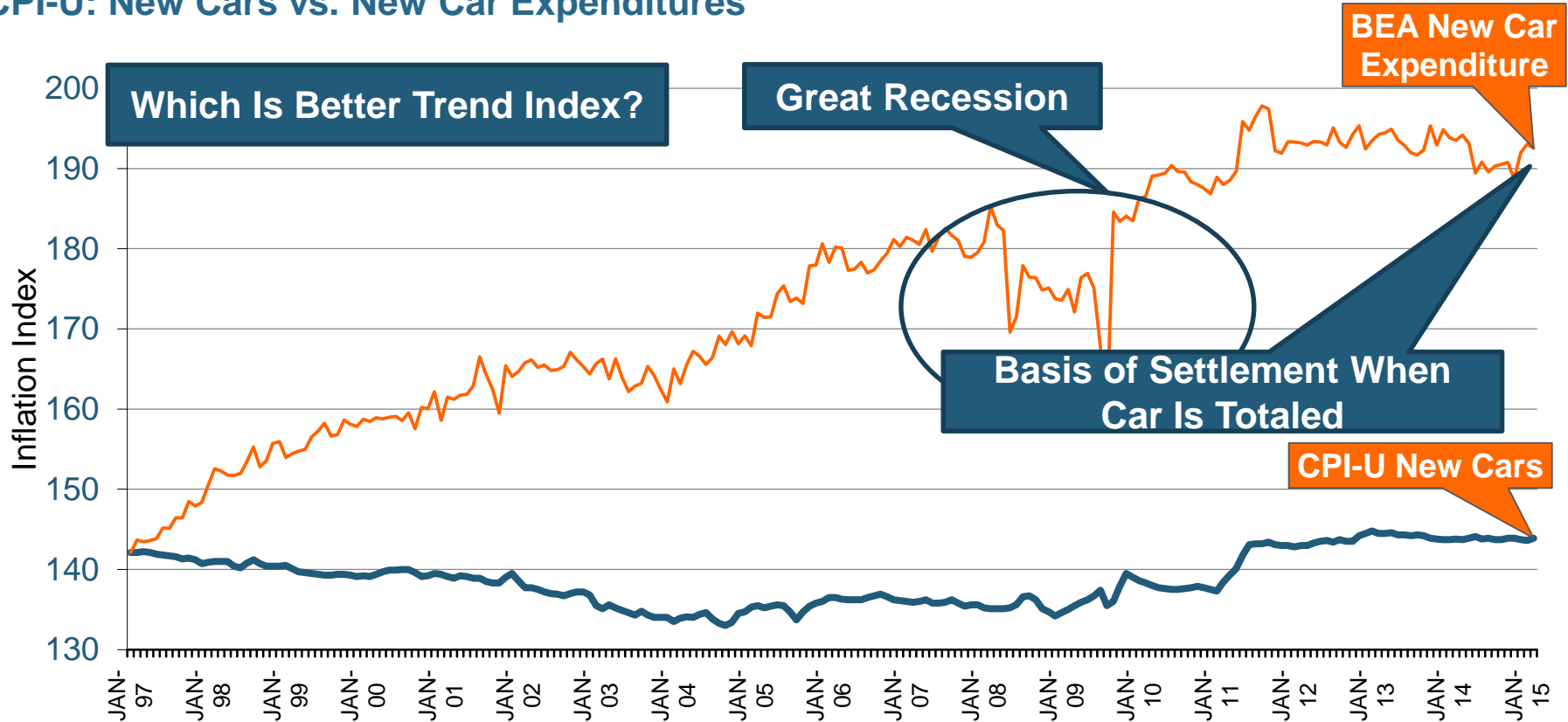
**According to Government, Auto Prices Have Been 'Flat' for Nearly Two Decades.**

Not Seasonally Adjusted. 1982-84 = 100.

Sources: Bureau of Labor Statistics, Insurance Information Institute.

# Inflation in Auto Prices

## CPI-U: New Cars vs. New Car Expenditures



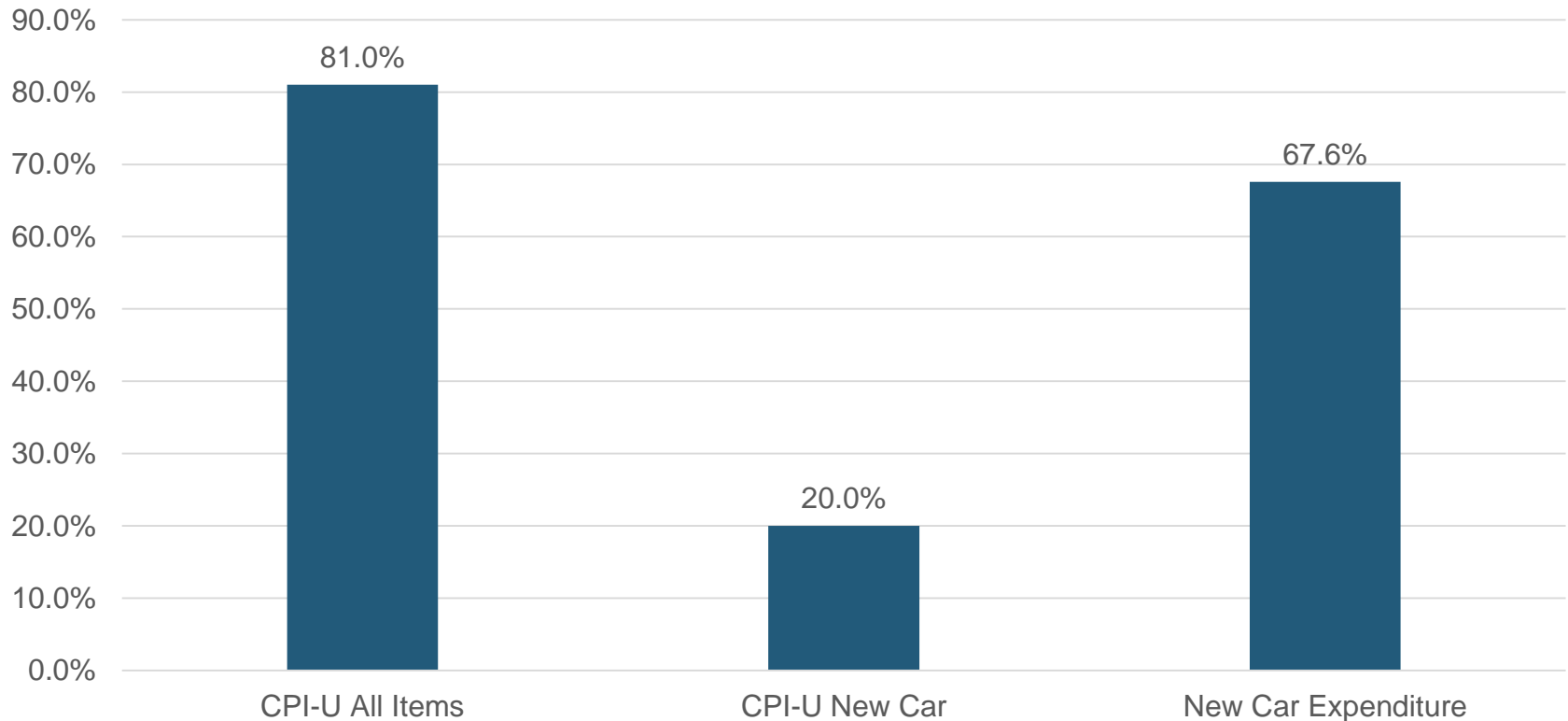
**According to Government, Auto Prices Have Been 'Flat' for Nearly Two Decades. But New Car Expenditures Are Up 35%.**

Expenditure Indexed to CPI-New Autos as of January 1997. Not Seasonally Adjusted. For CPI, 1982-84 = 100.  
Sources: Bureau of Economic Analysis, Insurance Information Institute.



# Auto Prices vs. Auto Inflation

## % Increase, 1990-2013



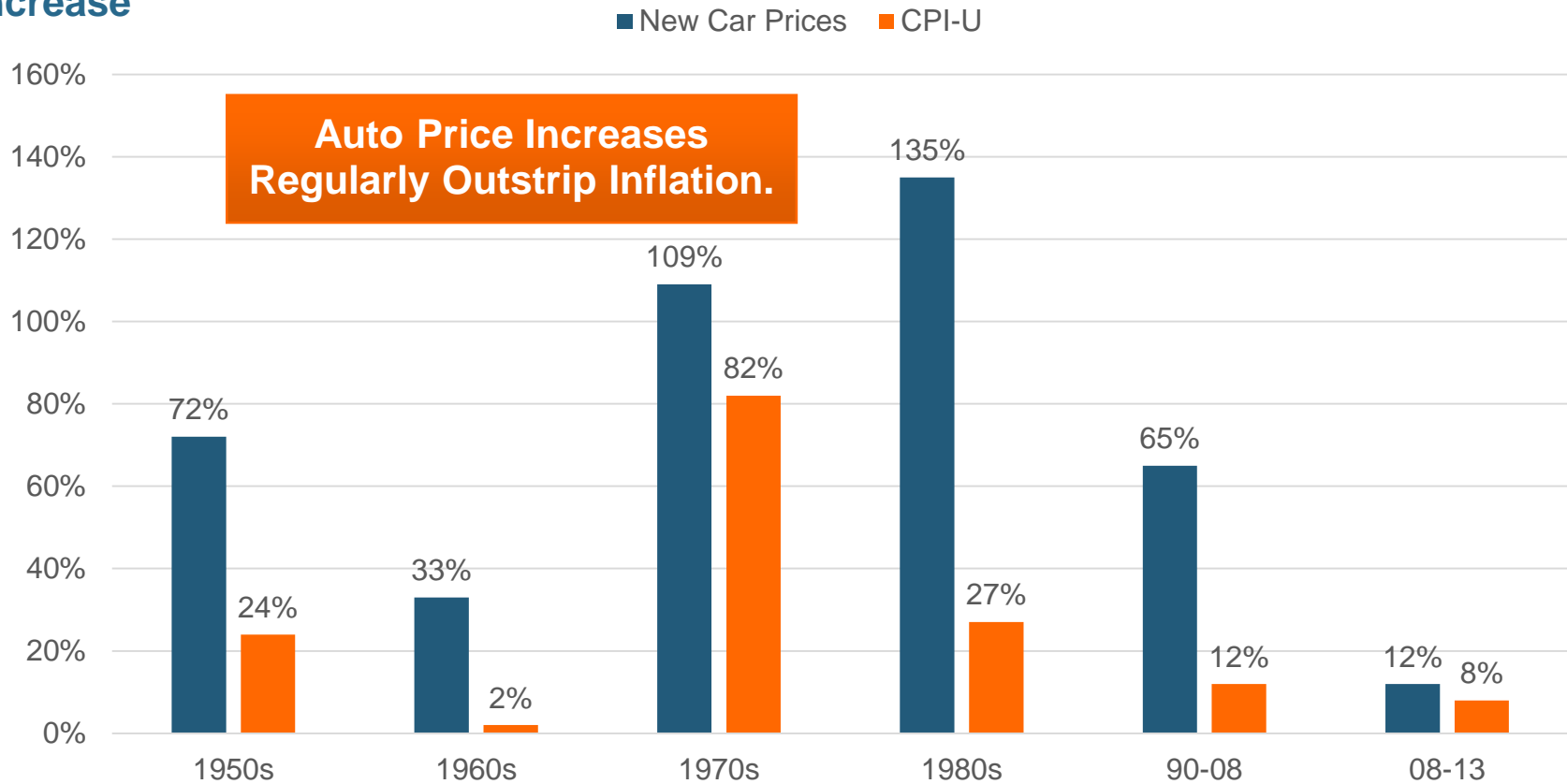
**From 1990 to 2013, Actual New Car Prices Rose Three Times Faster Than New Car Inflation Rate.**

Not Seasonally Adjusted. 1982-84 = 100.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; Calculations by Insurance Information Institute.

# Auto Prices vs. Auto Inflation

% Increase



**The Difference: Safety Improvements, Conveniences.**

Not Seasonally Adjusted.

Sources: The People History; Bureau of Labor Statistics; Calculations by Insurance Information Institute.

## ■ Safety Improvements

- ◆ Airbags
- ◆ Seatbelts

## ■ Mechanical/electrical

- ◆ Braking Improvements
- ◆ Battery Life

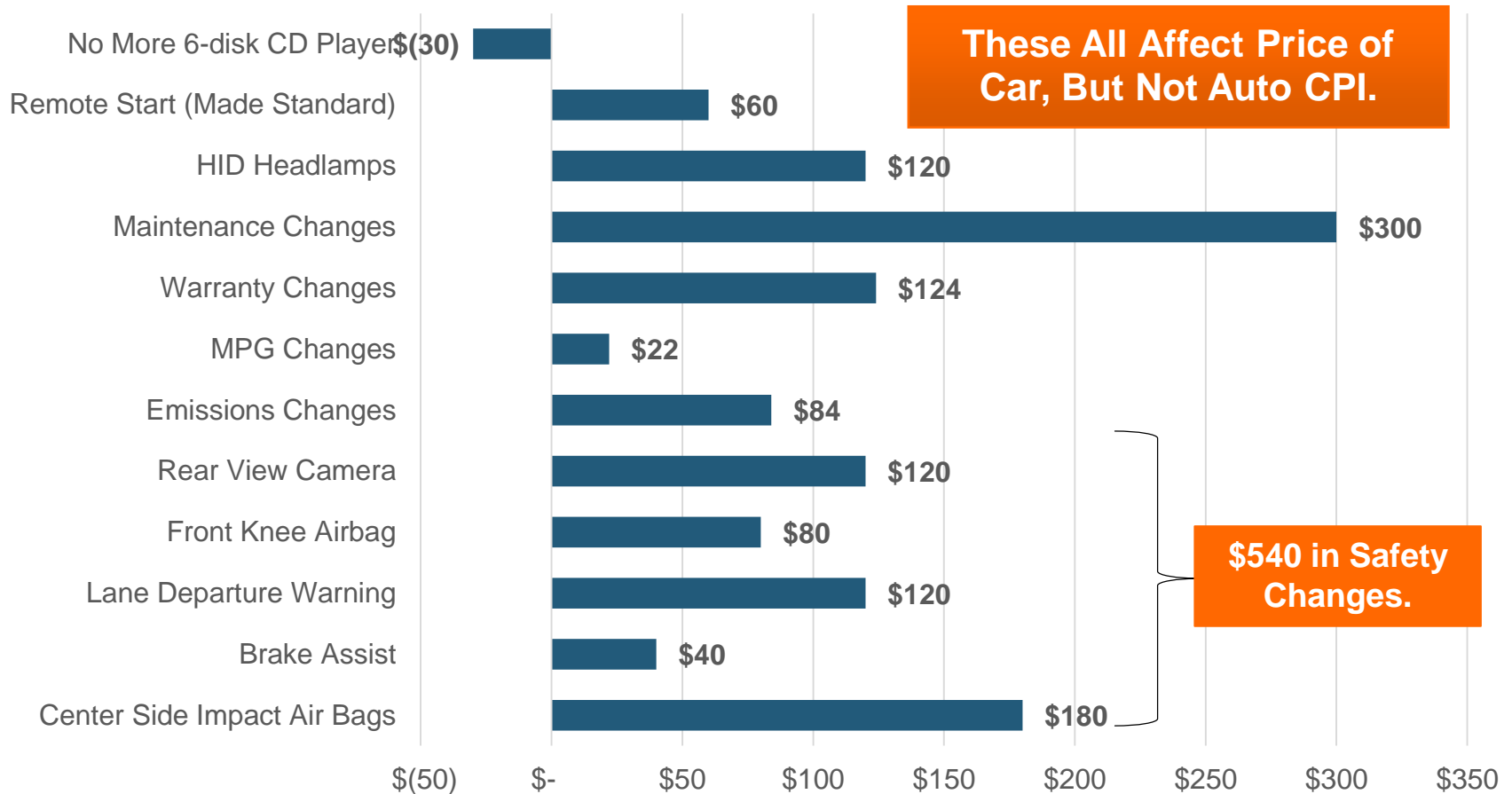
## ■ Durability

- ◆ Stronger Bumpers
- ◆ Flexible Body Panels

## ■ Comfort/convenience Changes

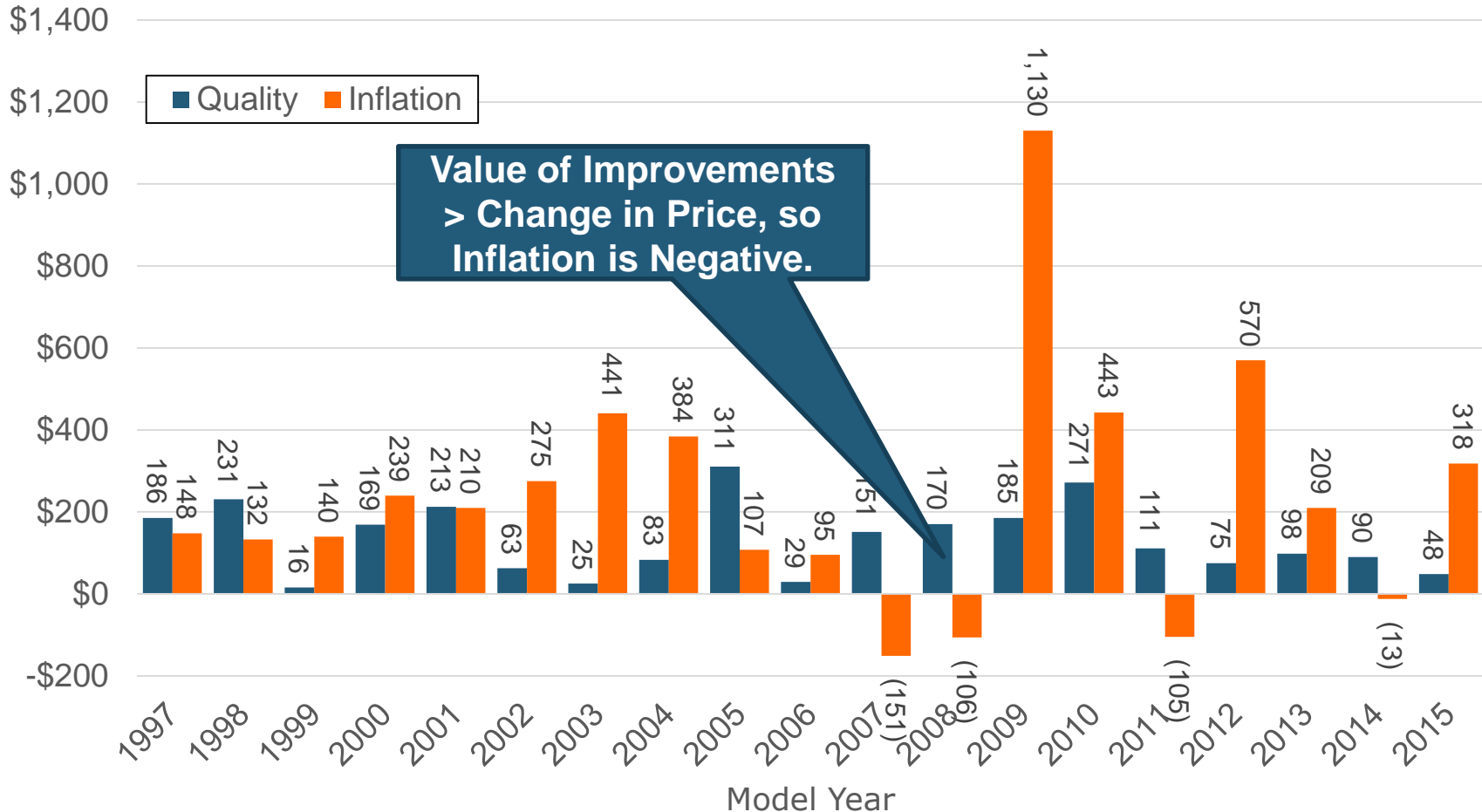
- ◆ Remote Door Locks
- ◆ GPS Systems

# Typical Adjustments (2013-14 Model Years)



**Changes Above Would Increase Car Price By \$1,220. CPI Impact – 0%.**

# Auto Price Change: Quality vs. Inflation



**Sales Year Is Similar to Calendar Year. Model Year Is Similar to Policy Year.**

Sources: Bureau of Labor Statistics, Insurance Information Institute.

# Other Adjustments (A Quiz)

Adjustment	Counted As Inflation	Not Counted As Inflation
Mix of Model Years Within Sales Year		★
Environmental (Clean Air Regs.)	★	
Rebates	★	
Concessions (Negotiation)	★	
Low Interest Financing		★

It Doesn't Change PV(Car)!

It's an Apples-to-Apples Comparison!

Of Course It Is!

It's a Pigovian Tax!

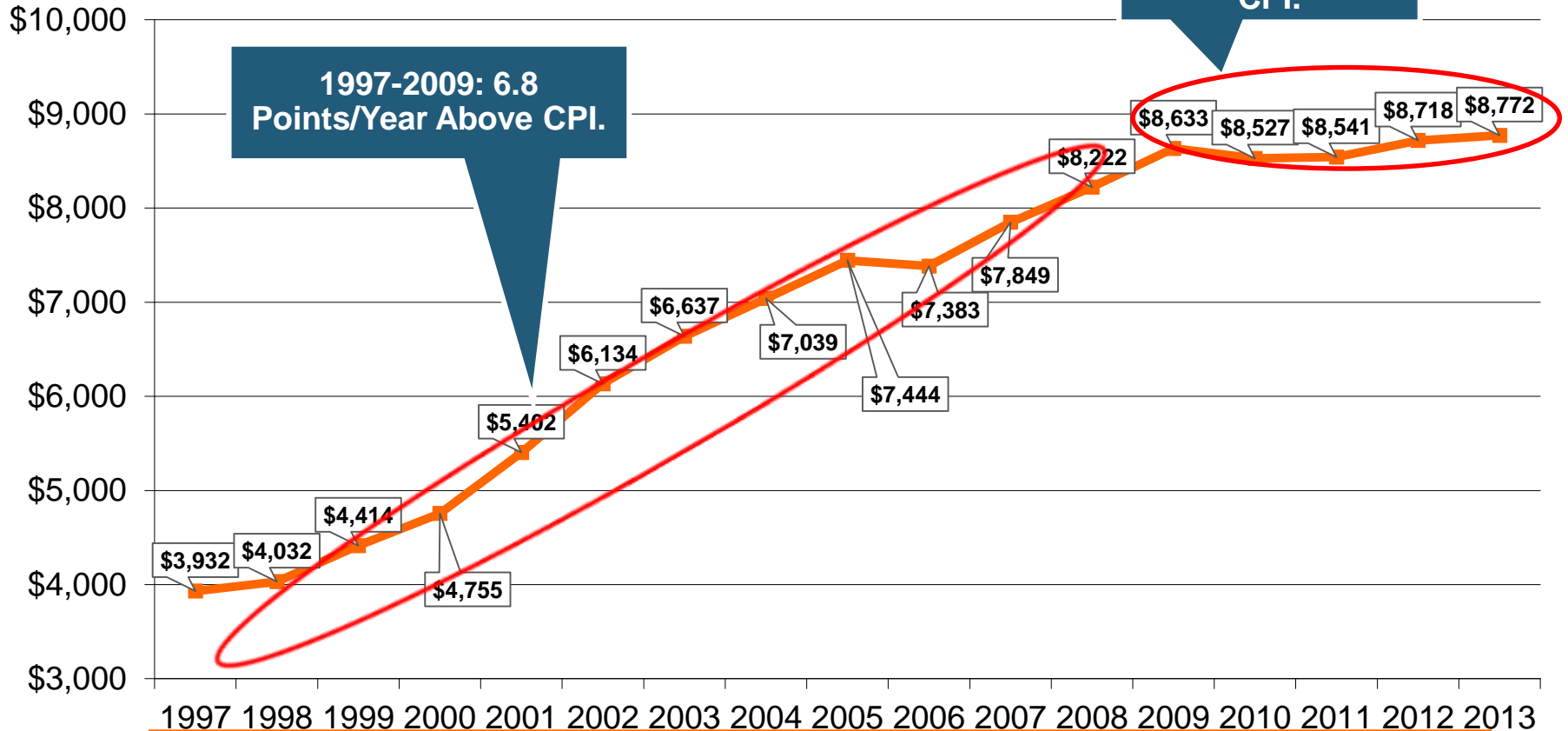
Of Course It Is!

# Inflation vs. Trend (The Sequel)

***The Idea:  
Trend  $\geq$  Inflation  
(Except When It Isn't)***

# An Example: Homeowners Non-cat Severity

Paid Severity in 2013 dollars

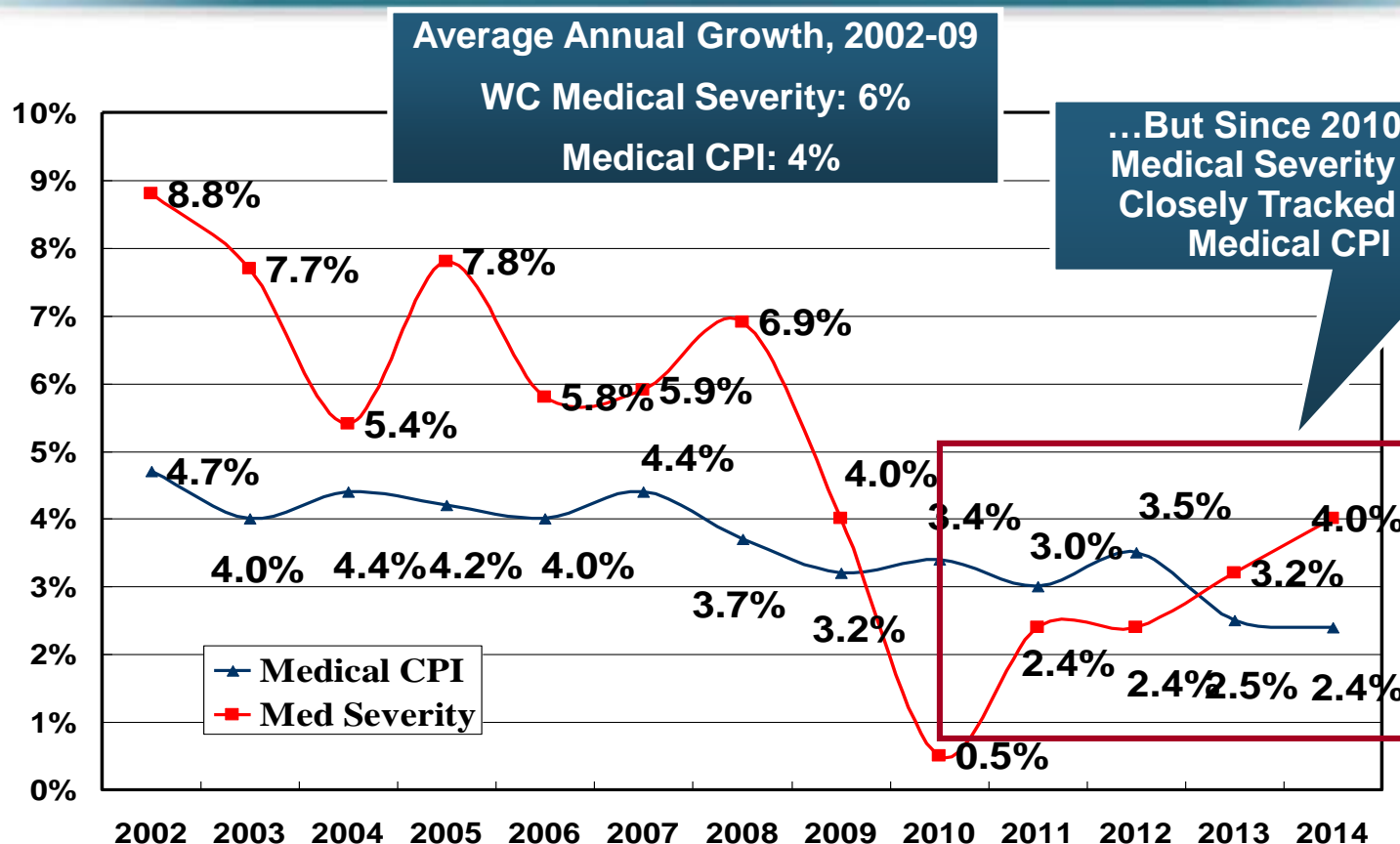


**There Can Be Periods Where CPI > Severity Change.**

Sources: Insurance Research Council, "Trends in Homeowners Insurance Claims," 2015 edition, p. 41; BLS inflation calculator, with Insurance Information Institute calculations

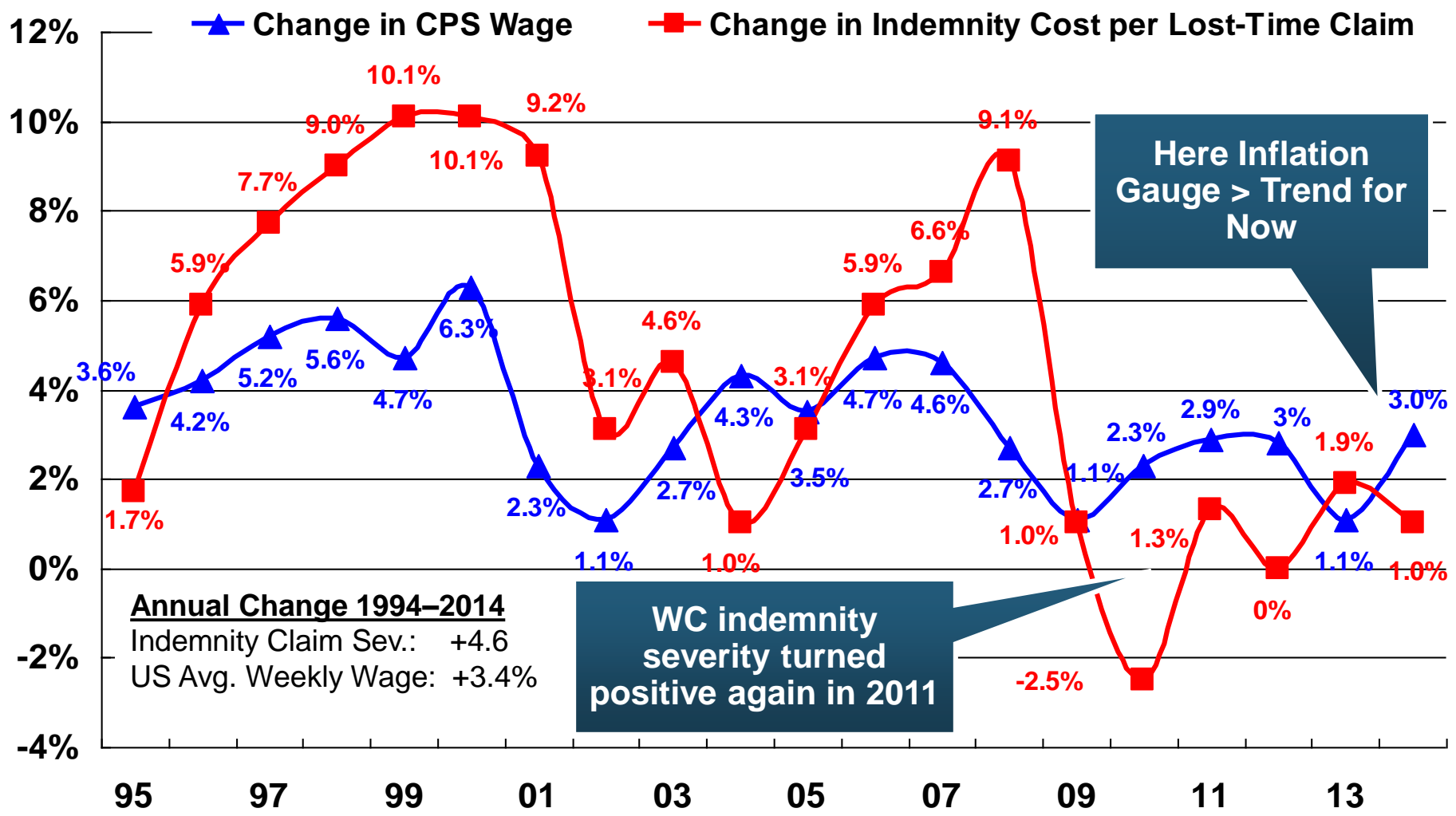


# Another Example: WC Medical



Sources: CPI and Med CPI from US Bureau of Labor Statistics, WC med severity from NCCI based on NCCI states.

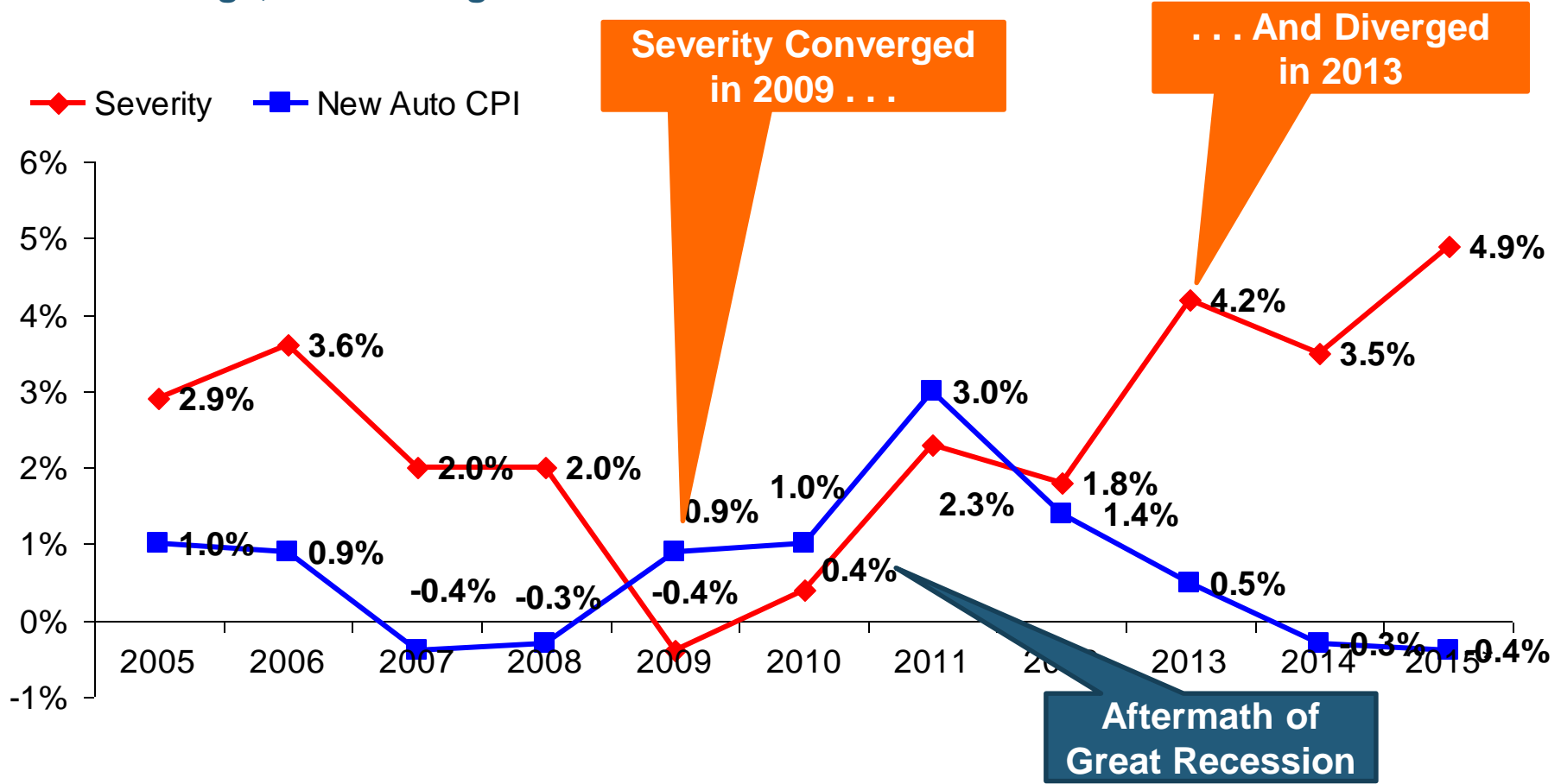
# WC Indemnity Severity vs. Wage Inflation, 1995-2014p



2014p: Preliminary based on data valued as of 12/31/2014; 1991-2010: Based on data through 12/31/2010, developed to ultimate. Based on the states where NCCI provides ratemaking services. Excludes the effects of deductible policies. CPS = Current Population Survey.  
 Source: NCCI

# Auto PD Liability

Annual Change, 2005 through 2015\*

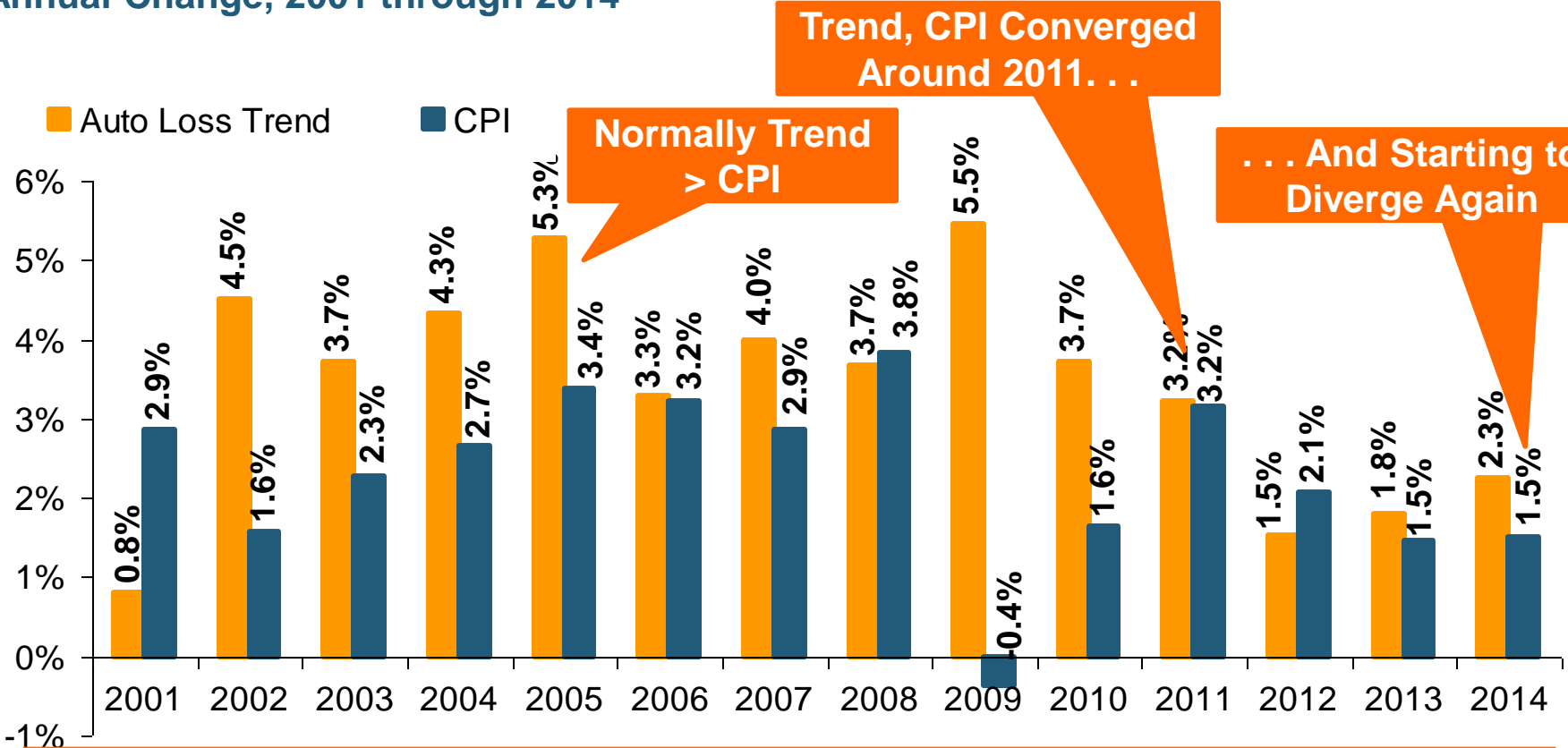


\*Through Second Quarter.

Sources: ISO/PCI *Fast Track* data, Bureau of Labor Statistics, Insurance Information Institute.

# Auto Severity: Loss Trend vs. Inflation

Annual Change, 2001 through 2014



Trend, CPI Converged Around 2011...

Normally Trend > CPI

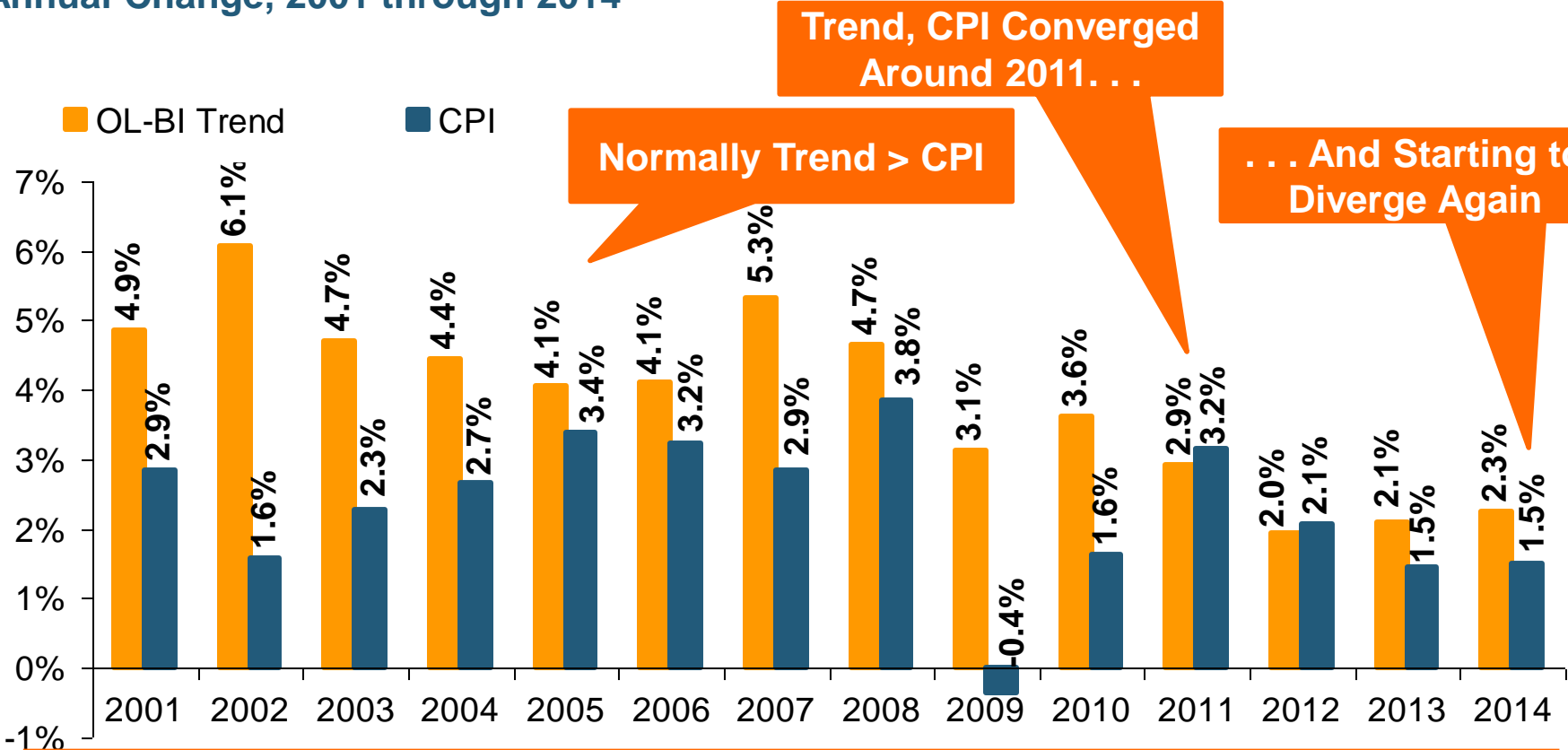
... And Starting to Diverge Again

**If Loss Trends Return to the Norm, Upward Pressure Will Be Applied to Loss Costs.**

Source: Towers Watson Claim Cost Index, Insurance Information Institute.

# Other Liability (BI) Severity: Loss Trend vs. Inflation

Annual Change, 2001 through 2014



Trend, CPI Converged Around 2011...

Normally Trend > CPI

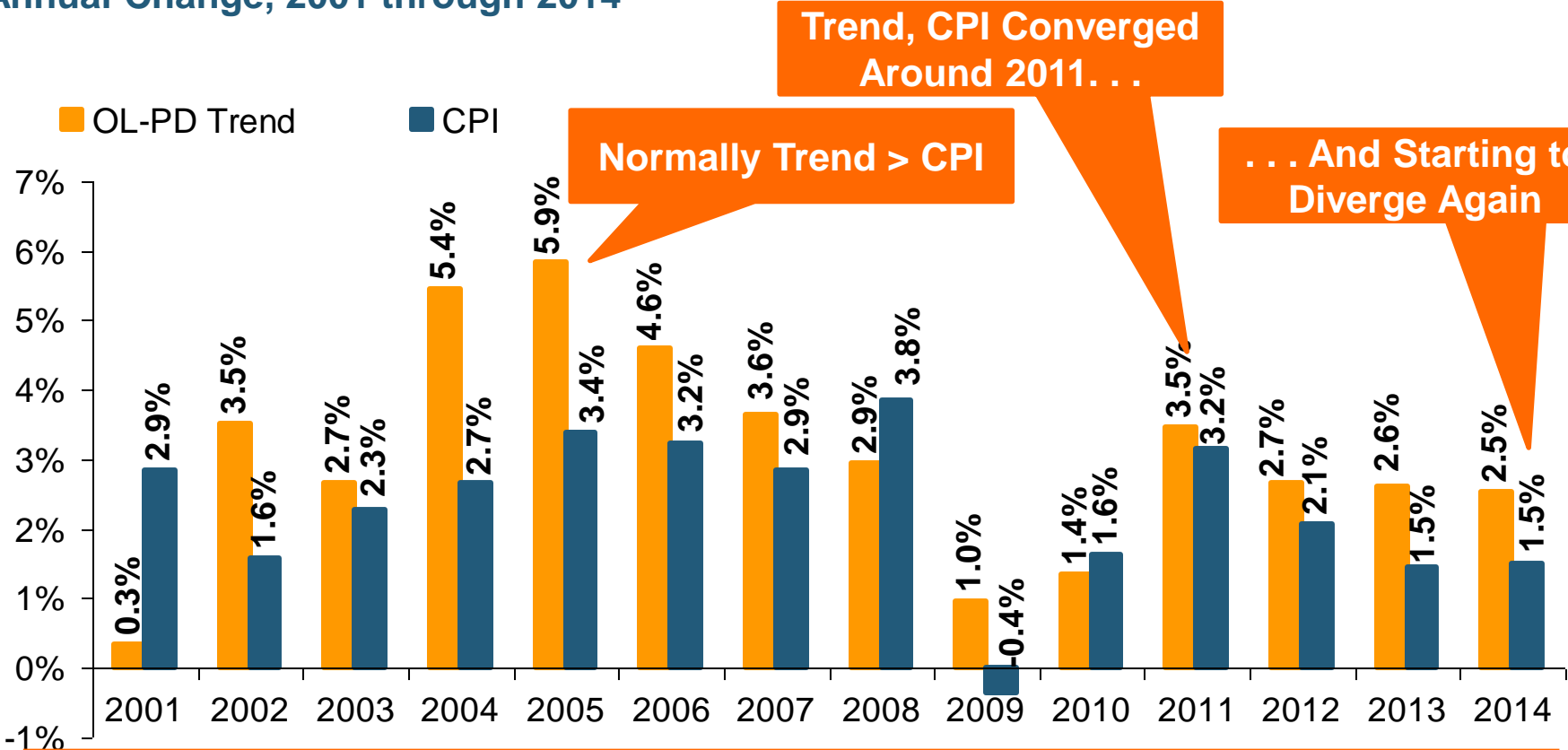
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Annual Change, 2001 through 2014



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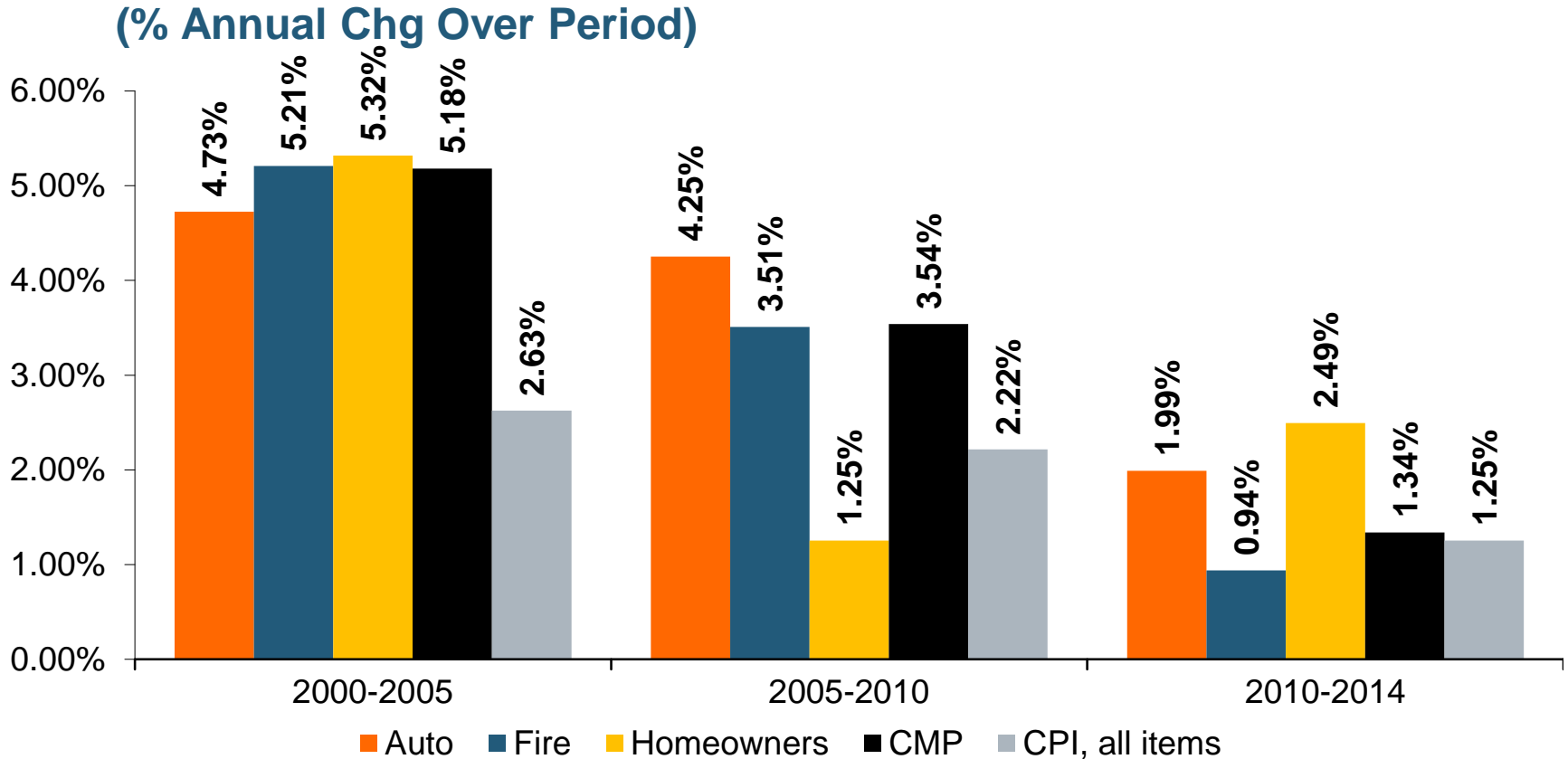
Normally Trend > CPI

... And Starting to Diverge Again

**If Loss Trends Return to the Norm, Upward Pressure Will Be Applied to Loss Costs.**

Source: Towers Watson Claim Cost Index, Insurance Information Institute.

# Claim Inflation vs. CPI: Not Just Auto



**In Recent Years, Claim Costs Have Risen at About the Inflation Rate. If We Return to the Norm, Claim Costs Will Rise.**

Source: Insurance Information Institute calculation from Towers Watson data.

# How Could Inflation > Trend?

- $\Delta$  Severity =  $\Delta$  Quality +  $\Delta$  Inflation
  - ◆ Base Case:  $\Delta$  Severity >  $\Delta$  Inflation
  - ◆  $\Delta$  Severity <  $\Delta$  Inflation Implies . . .
  - ◆ . . .  $\Delta$  Quality < 0.0
  - ◆ Are Cars Getting Worse?
  - ◆ NAH!!!!
  
- Better Insurance Claims Control?
  
- Safer Cars Eliminate Expensive Claims?
  
- We Do Need to Think About Impact When  $\Delta$  Severity  $\rightarrow$   $\Delta$  Inflation – Will It Diverge Again?



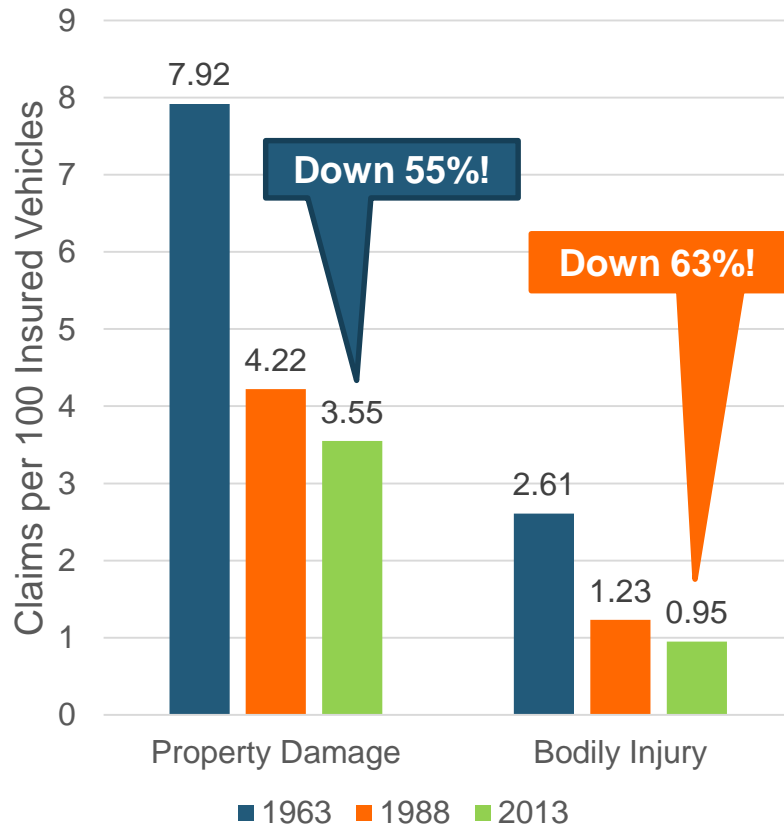
# The Bad News

***Severity is Only Half the Problem***

# If Frequency Is Falling, Why Does Auto Insurance Keep Costing More?

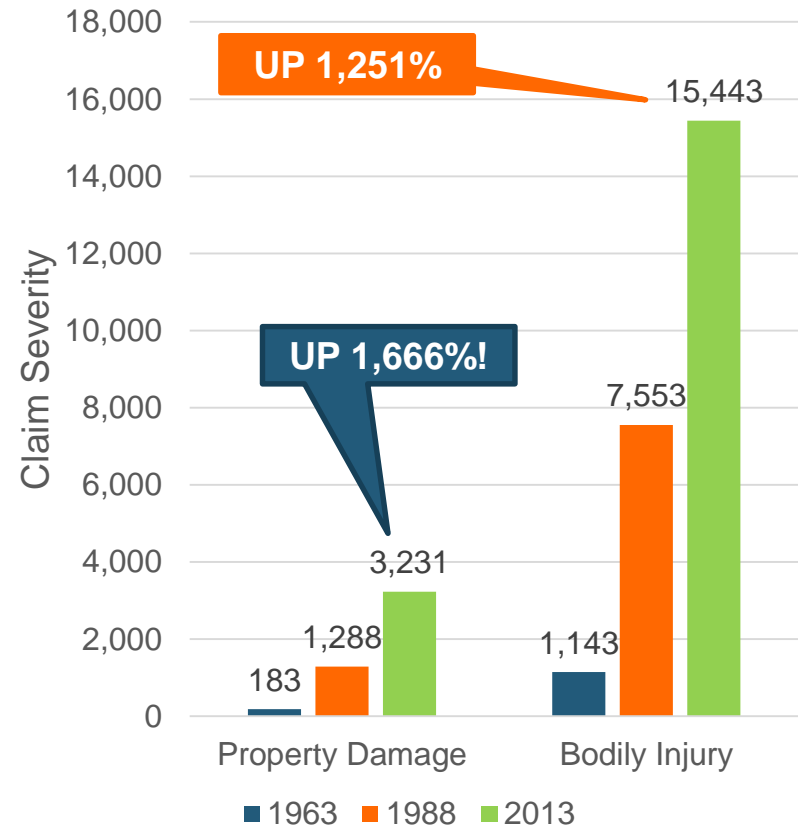
## Safer Cars . . . .

### Frequency



## . . . That Cost More to Repair.

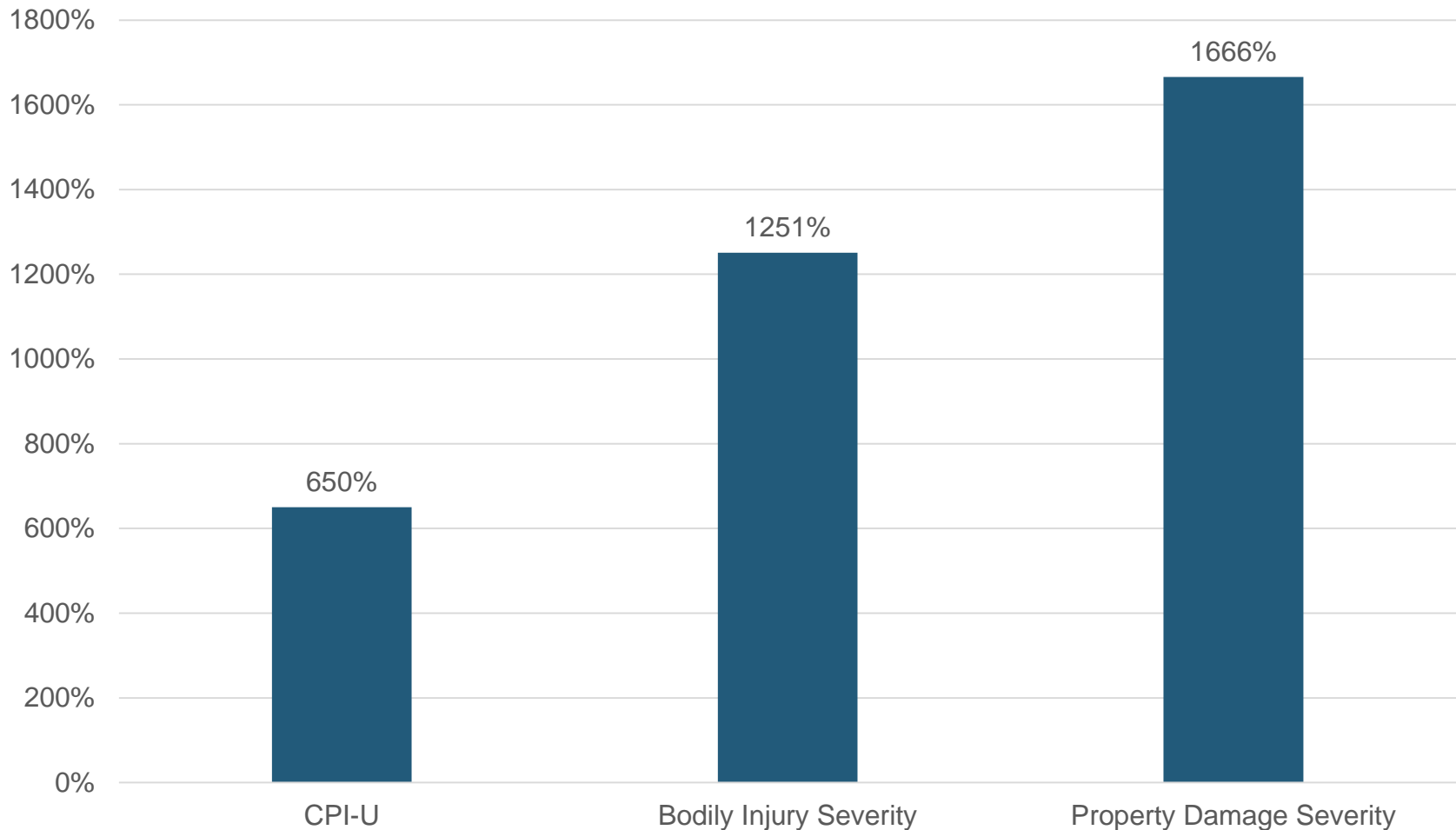
### Severity



Sources: Insurance Institute for Highway Safety, Insurance Services Office, Insurance Information Institute.

# Claim Severity Has Grown Faster Than Inflation for 50 Years

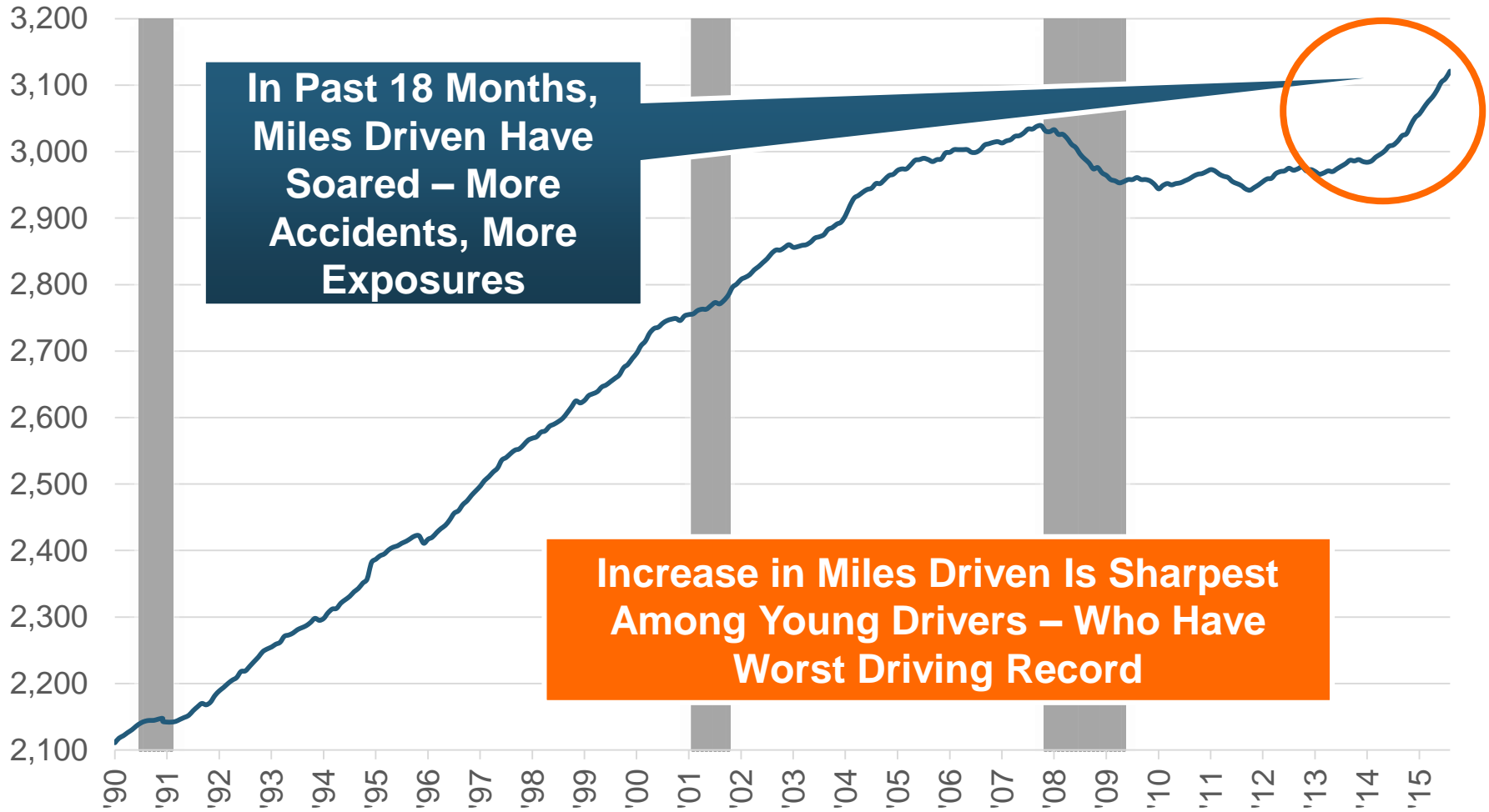
## Percentage Change, 1963-2013



Sources: Insurance Services Office, Bureau of Labor Statistics, calculations by Insurance Information Institute.

# Frequency: The Chart of the Year

Billions of Miles

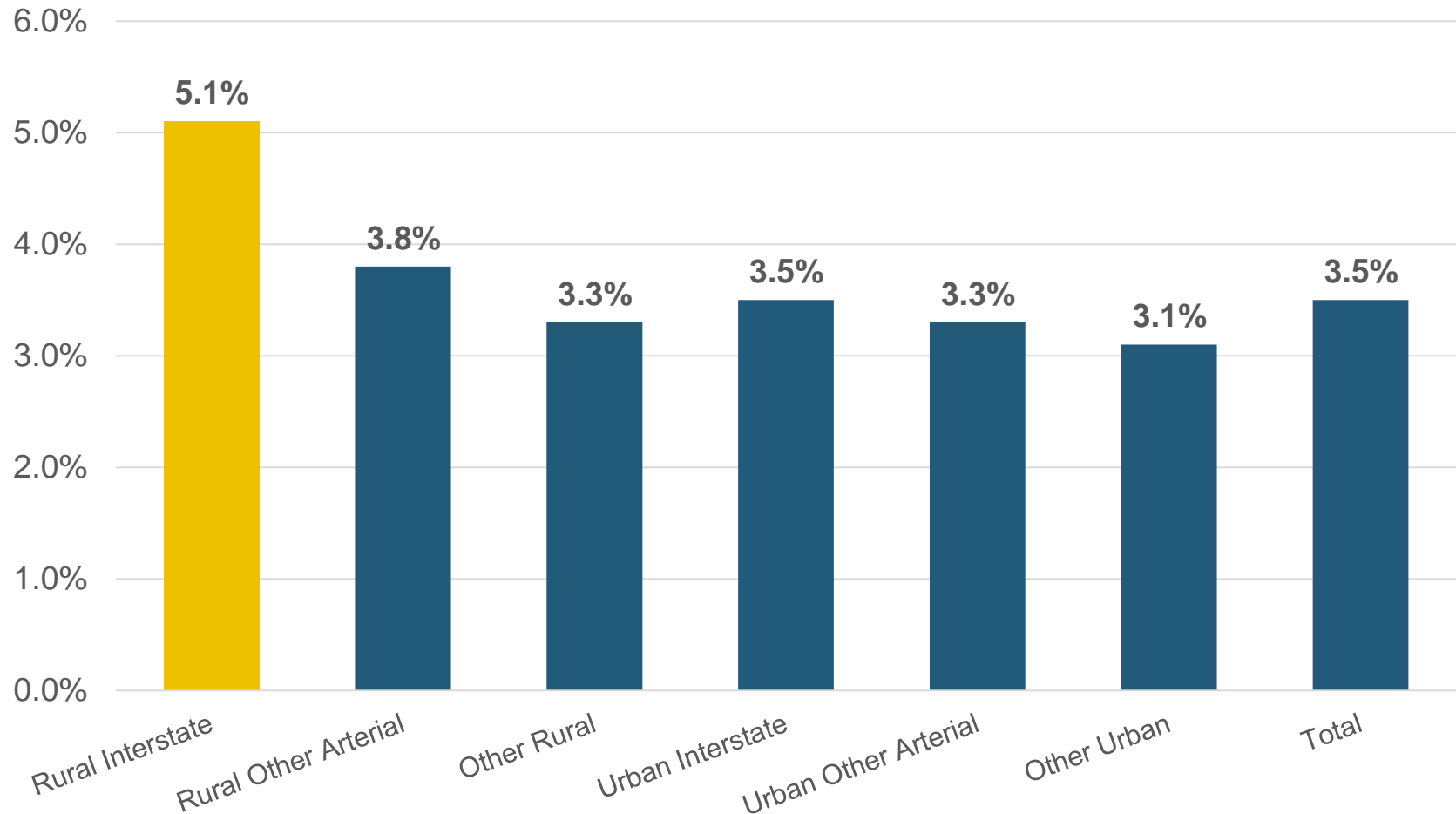


\*Moving 12-month total. Data through September 2015.  
Note: Recessions indicated by gray shaded columns.

Sources: Federal Highway Administration ([http://www.fhwa.dot.gov/policyinformation/travel\\_monitoring/tvt.cfm](http://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm)); National Bureau of Economic Research (recession dates); Insurance Information Institute.

# Frequency: Rural Interstate Driving Is Rising Fastest

## Miles Driven, Percentage Change YTD\*

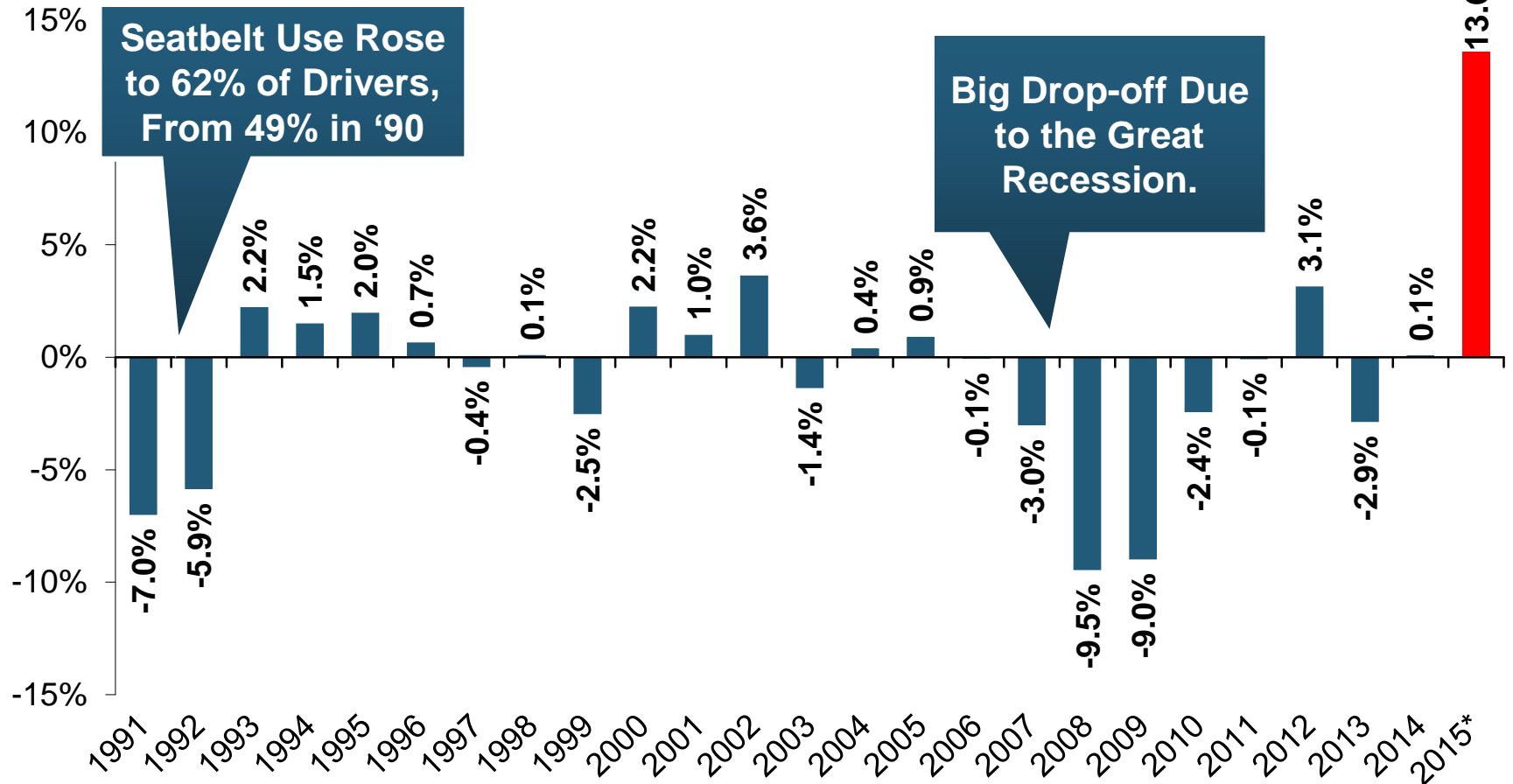


\* Through September.

Sources: Insurance Services Office, Bureau of Labor Statistics, calculations by Insurance Information Institute.

# Severity: Driving Fatalities Are Rising

## Annual Change in Motor Vehicle Deaths

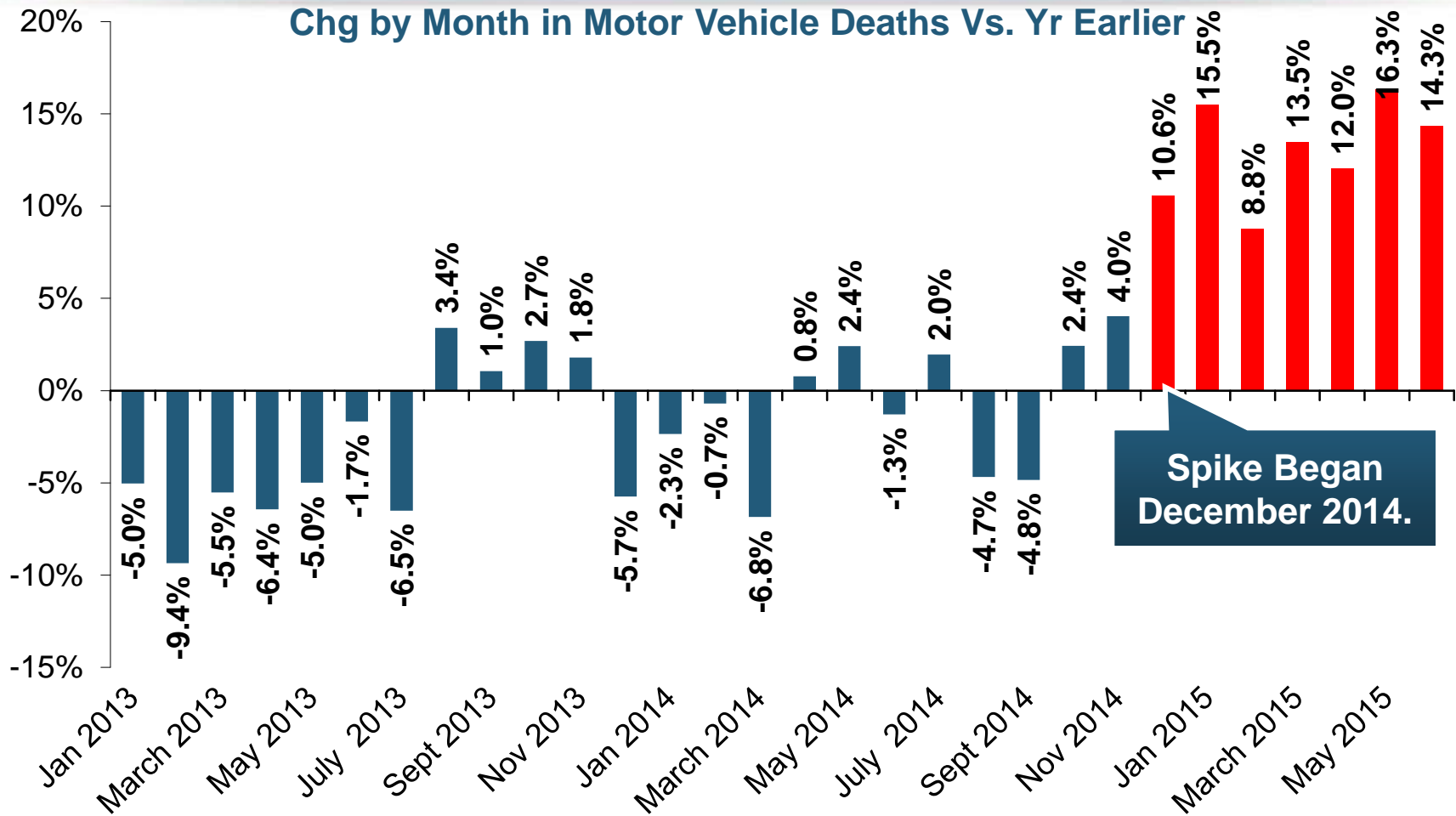


**Driving Has Been Getting Safer For Decades, But Recent Trend Is Discouraging.**

\* Through June 2015.

Sources: National Safety Council, Insurance Information Institute.

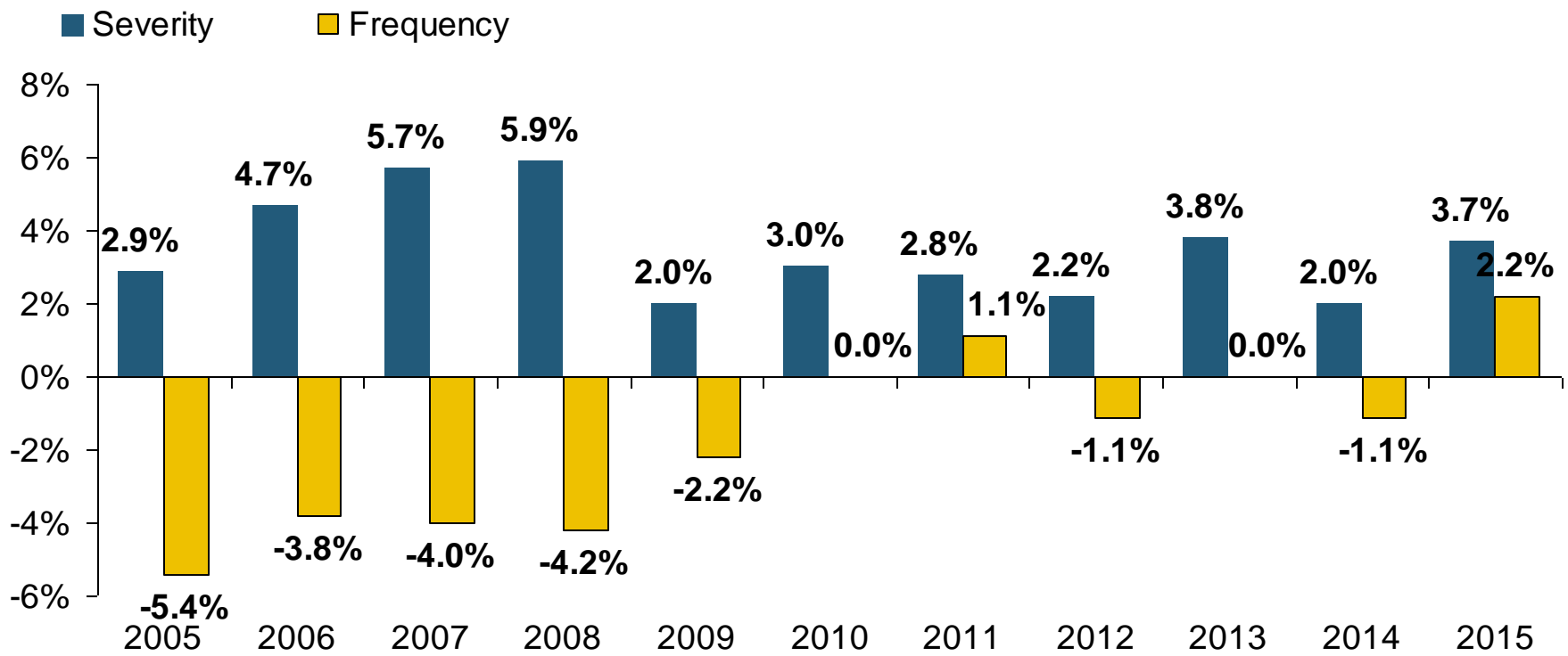
# Severity: Driving Fatalities Are Rising



**On Track for Most Auto Fatalities Since 2007.**

# Bodily Injury: Severity, Frequency Trend Are Rising

Annual Change, 2005 through 2015\*



**Cost Pressures Will Increase if BI Severity Increases Continue or Frequency Ticks Up**

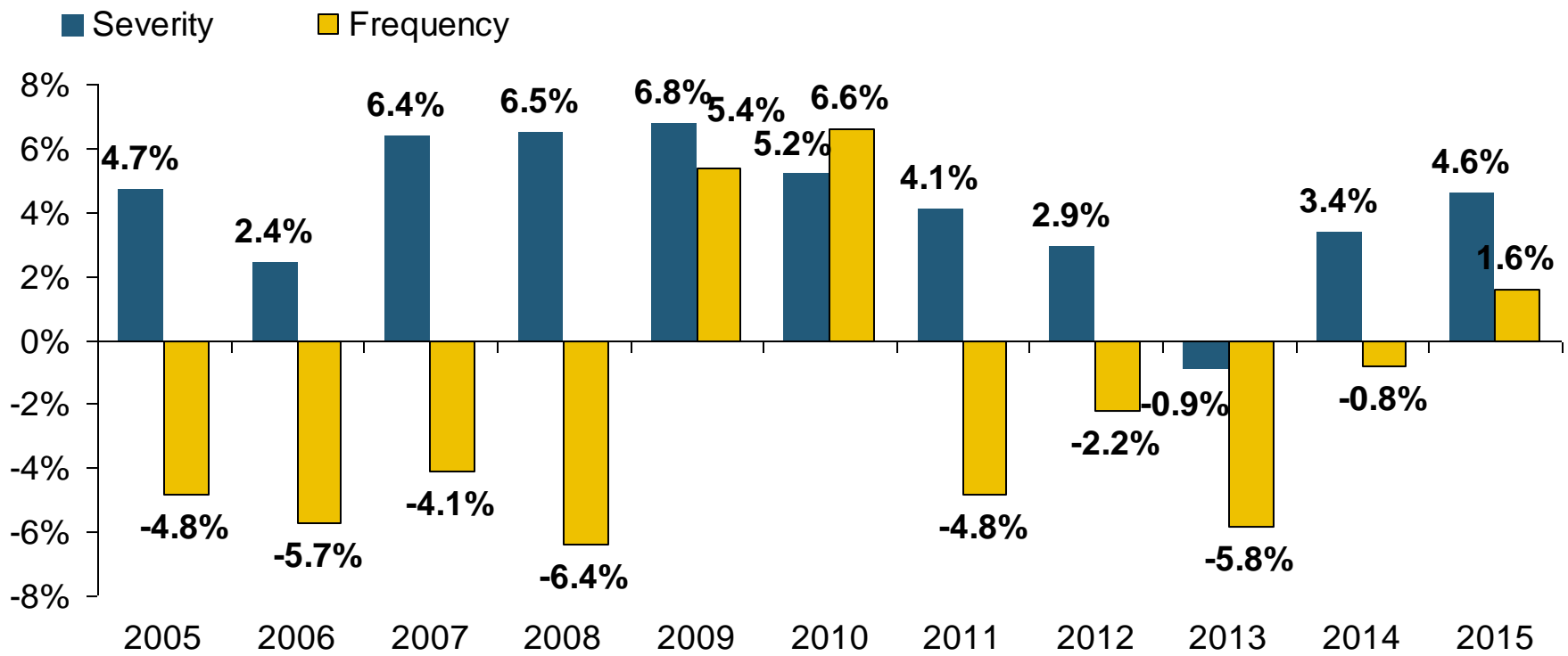
\*Through midyear.

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



# No-Fault (PIP) Liability: Frequency, Severity Are Rising\*

Annual Change, 2005 through 2015\*



**In Late '00s Multiple States Experienced Fraud/Abuse Problems in their No-Fault Systems, Especially FL, MI, NY and NJ**

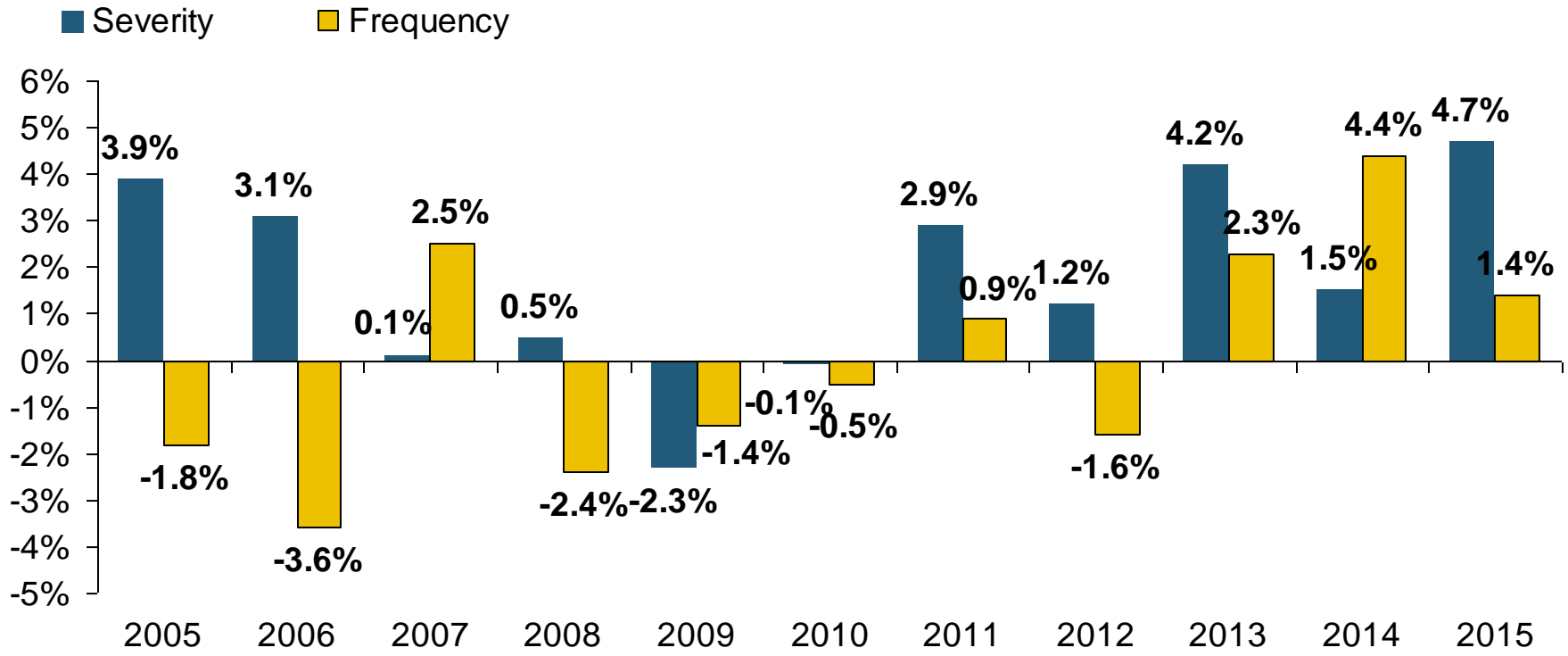
\*No-fault states included are: FL, HI, KS, KY, MA, MI, MN, NY, ND and UT. \*\*2013 figure is for the 4 quarters ending in 2013:Q3. \*Through midyear.

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

# Collision Coverage: Severity & Frequency Trends Are Both Rising



Annual Change, 2005 through 2015\*



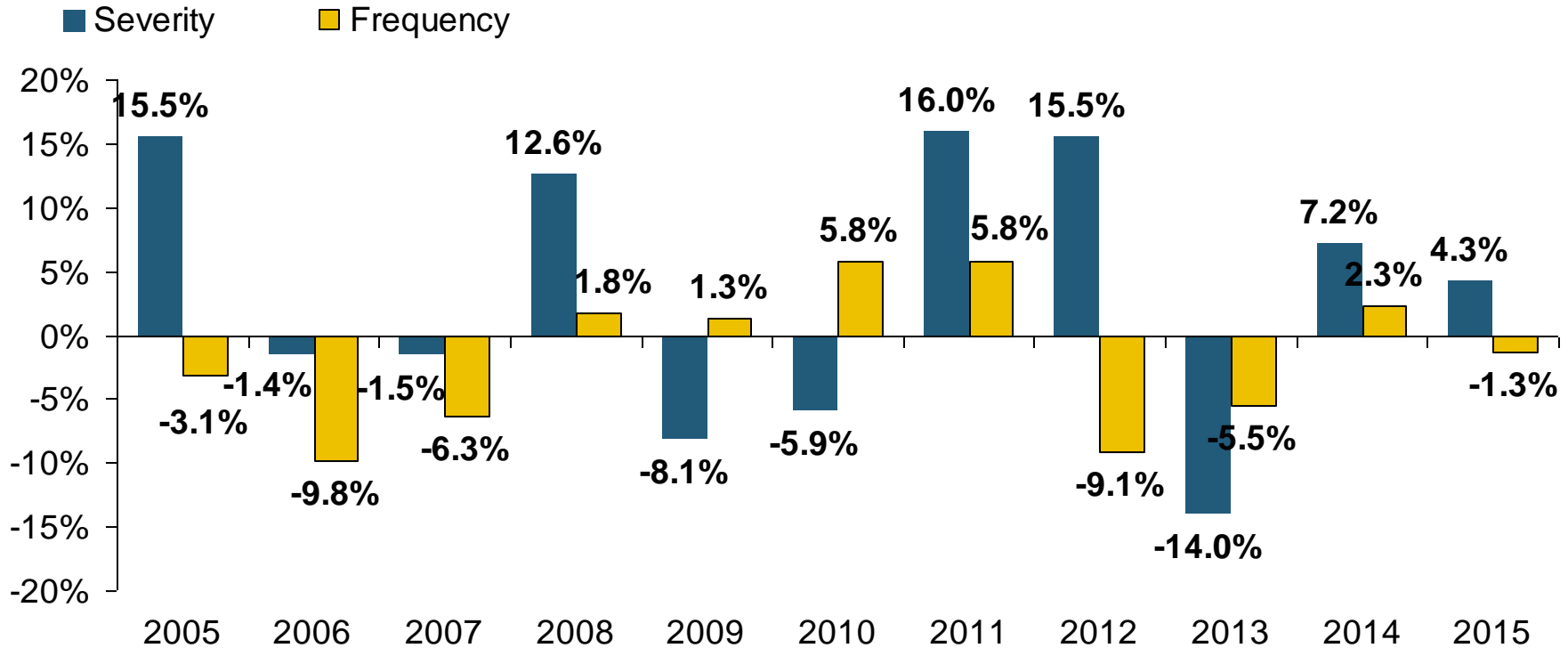
**The Recession, High Fuel Prices Helped Temper Frequency and Severity, But this Trend Will Likely Be Reversed Based on Evidence from Past Recoveries**

\* Through midyear.

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

# Comprehensive Coverage: Severity Trends Are Unfavorable

Annual Change, 2005 through 2015\*



**Weather Creates Volatility for Comprehensive Coverage. Long-term Trend in Auto Theft is Favorable.**

\* Through midyear.

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

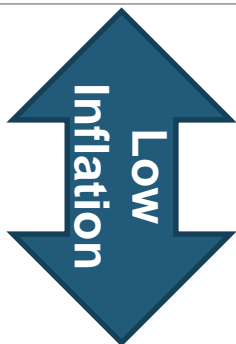
# What About Loss Reserves?

***The Idea:  
Inflation Lags Long-Term Average,  
And So Does Loss Trend***

# Loss Development Factors

## Age to Age Reported Loss Development Factors - P&C Industry

Accident Year	12 - 24 Months	24 - 36 Months	36 - 48 Months	48 - 60 Months	60 - 72 Months	72 - 84 Months	84 - 96 Months	96 - 108 Months	108 - 120 Months
2001	2.0677	1.4502	1.3170	1.1979	1.0866	1.0839	1.0762	1.0756	1.0517
2002	1.8992	1.5481	1.2450	1.1726	1.1063	1.0549	1.0730	1.0529	1.0307
2003	1.8481	1.5093	1.2143	1.1685	1.1060	1.0649	1.0781	1.0525	1.0516
2004	1.8071	1.3148	1.3307	1.1333	1.1198	1.1036	1.0531	1.0552	1.0406
2005	1.6358	1.5082	1.3227	1.2186	1.1718	1.0813	1.0572	1.0675	1.0535
2006	1.6401	1.4941	1.3249	1.1397	1.0859	1.0767	1.0803	1.0672	
2007	1.8650	1.4456	1.3850	1.1379	1.1152	1.0426	1.0425		
2008	1.8177	1.4458	1.1900	1.1542	1.0903	1.0720			
2009	1.7207	1.3274	1.2050	1.1175	1.0926				
2010	2.0081	1.2872	1.2918	1.1531					
2011	1.7579	1.4266	1.2254						
2012	1.8335	1.4336							
	1.7573								

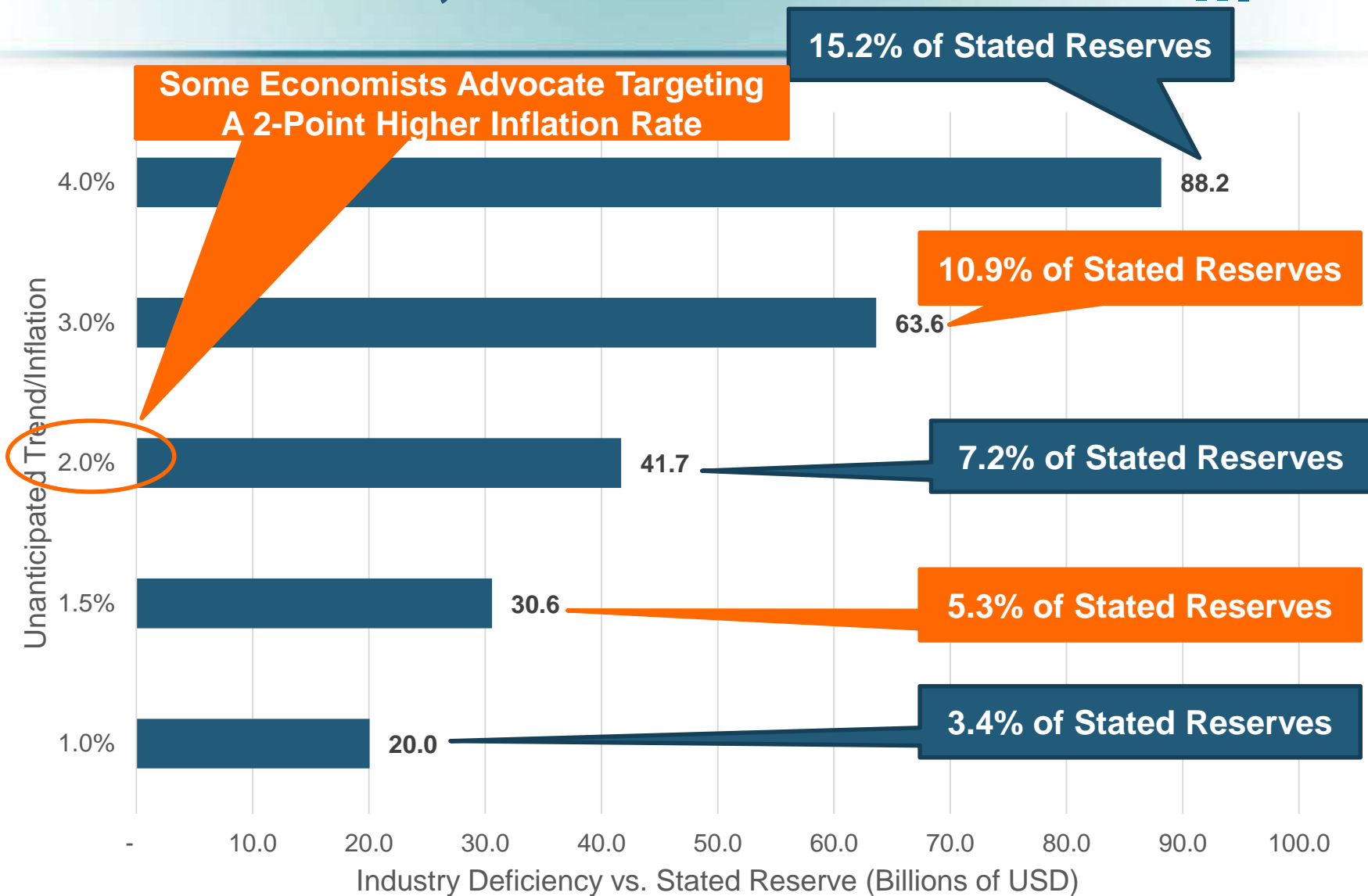


**Note Downward Trend**

Averages	12 - 24 Months	24 - 36 Months	36 - 48 Months	48 - 60 Months	60 - 72 Months	72 - 84 Months	84 - 96 Months	96 - 108 Months	108 - 120 Months
Industry - All Years Wtd	1.8186	1.4290	1.2763	1.1586	1.1073	1.0716	1.0656	1.0620	1.0458
Industry - 5 Years	1.8155	1.3841	1.2594	1.1405	1.1112	1.0752	1.0623	1.0591	1.0456
Industry - 3 Years Wtd	1.7811	1.3782	1.2405	1.1423	1.1005	1.0624	1.0591	1.0633	1.0485
Weighted	1.8051	1.3971	1.2587	1.1471	1.1063	1.0697	1.0623	1.0615	1.0466
Manual Selected	1.8051	1.3971	1.2587	1.1471	1.1063	1.0697	1.0623	1.0615	1.0466

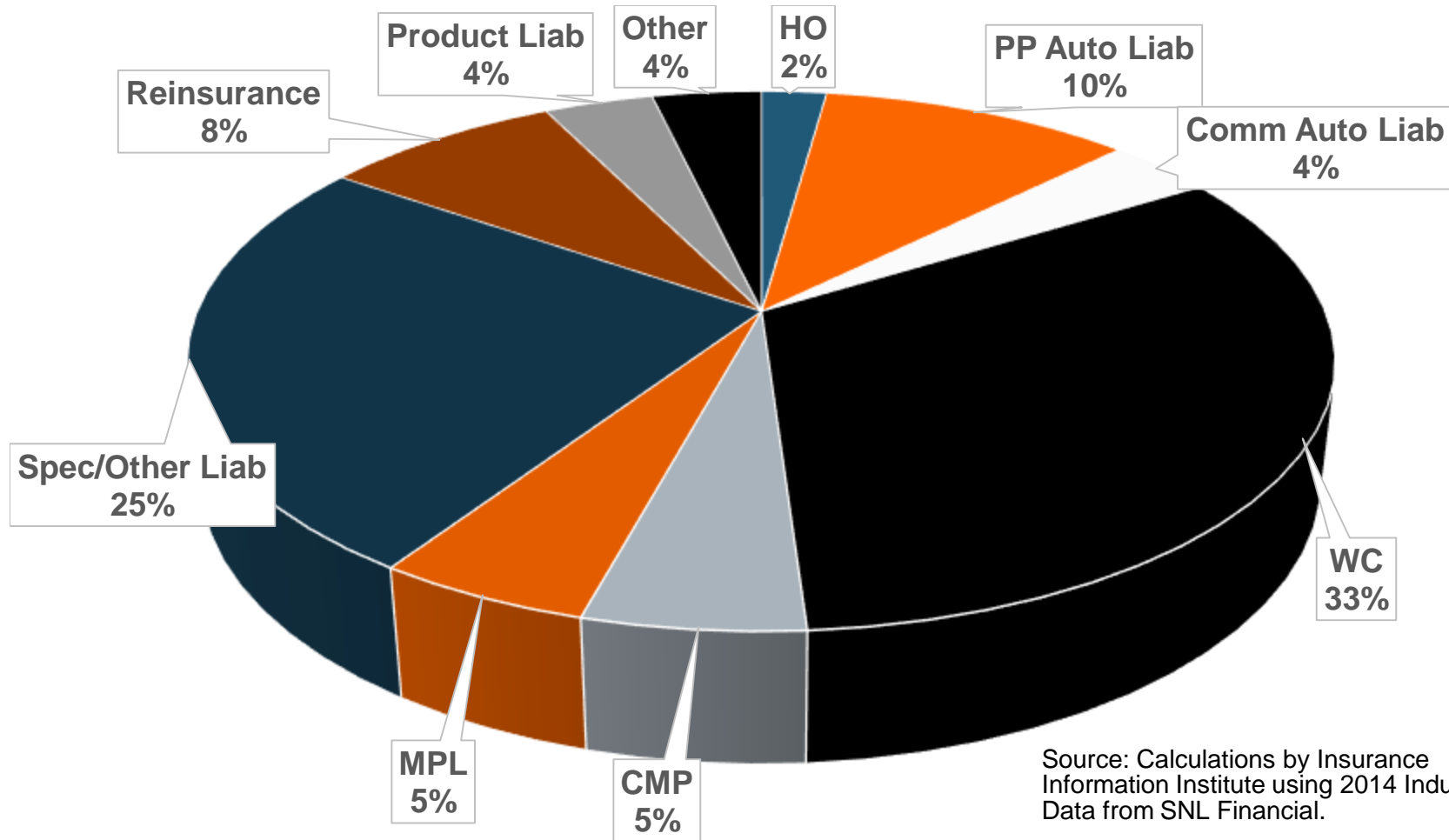
**All Factors Have Low Inflation. Past Three Years Have Low Trend.**

# What If Inflation, Trend Return?



# Which Lines Are Most Vulnerable to 2% Spike in Inflation/Trend?

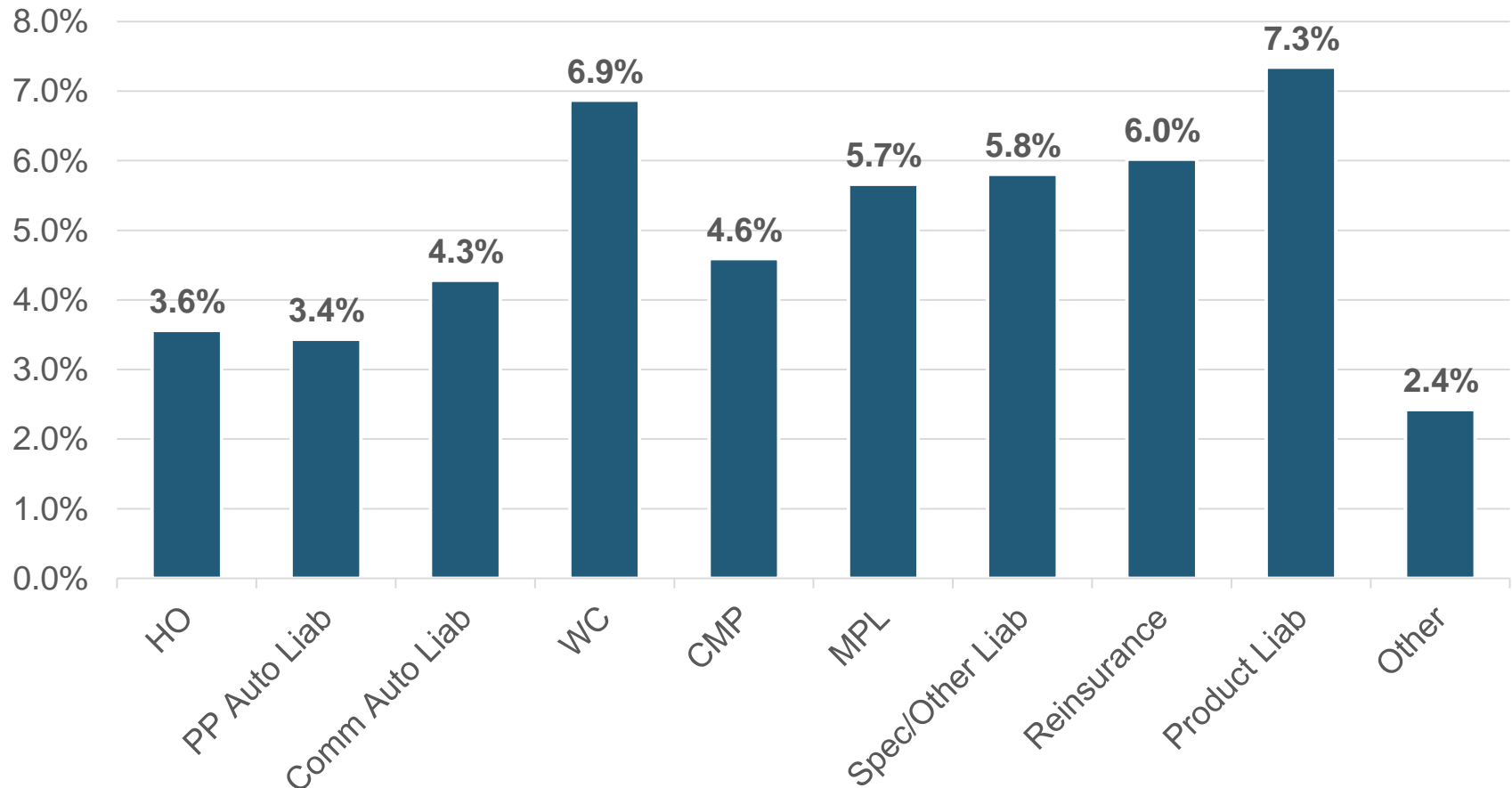
## Distribution of Reserve Increase By Line of Business



Source: Calculations by Insurance Information Institute using 2014 Industry Data from SNL Financial.

# Which Lines Are Most Vulnerable to 2% Spike in Inflation/Trend?

## Increase By % of Stated Reserve



**Some of These Lines Are Already Redundant Industrywide.**



- Inflation is Low and Likely to Stay That Way
- Low Yields Are Built Into P/C Investment, Pricing Strategy
- Severity Inevitably Outstrips Inflation
- Severity Has Been Abnormally Low But Is Returning to Long-Term Tendency
- Frequency Is Rising, Breaking Decadeslong Tendency
- Important Pricing/Reserving Implications

Insurance Information Institute Online:

[www.iii.org](http://www.iii.org)

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and your attention!*

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