



# Inflation From All Angles

Or . . .

**Casualty Actuarial Society Spring Meeting  
Colorado Springs, CO  
May 18, 2015**

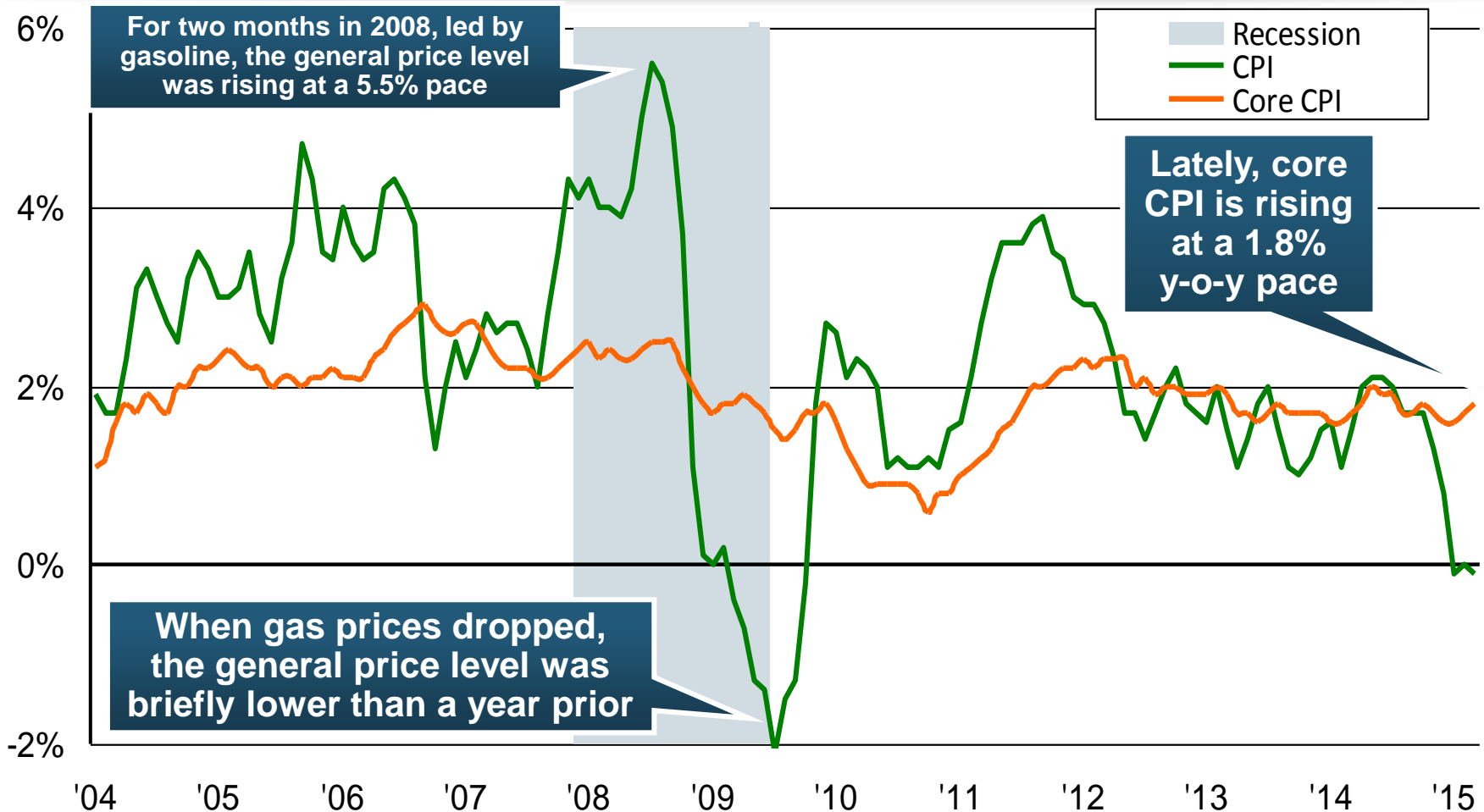
**Download at [www.iii.org/presentations](http://www.iii.org/presentations)**

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# What's the Best Way to Measure Past 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 March 2015. Not seasonally adjusted.

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

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

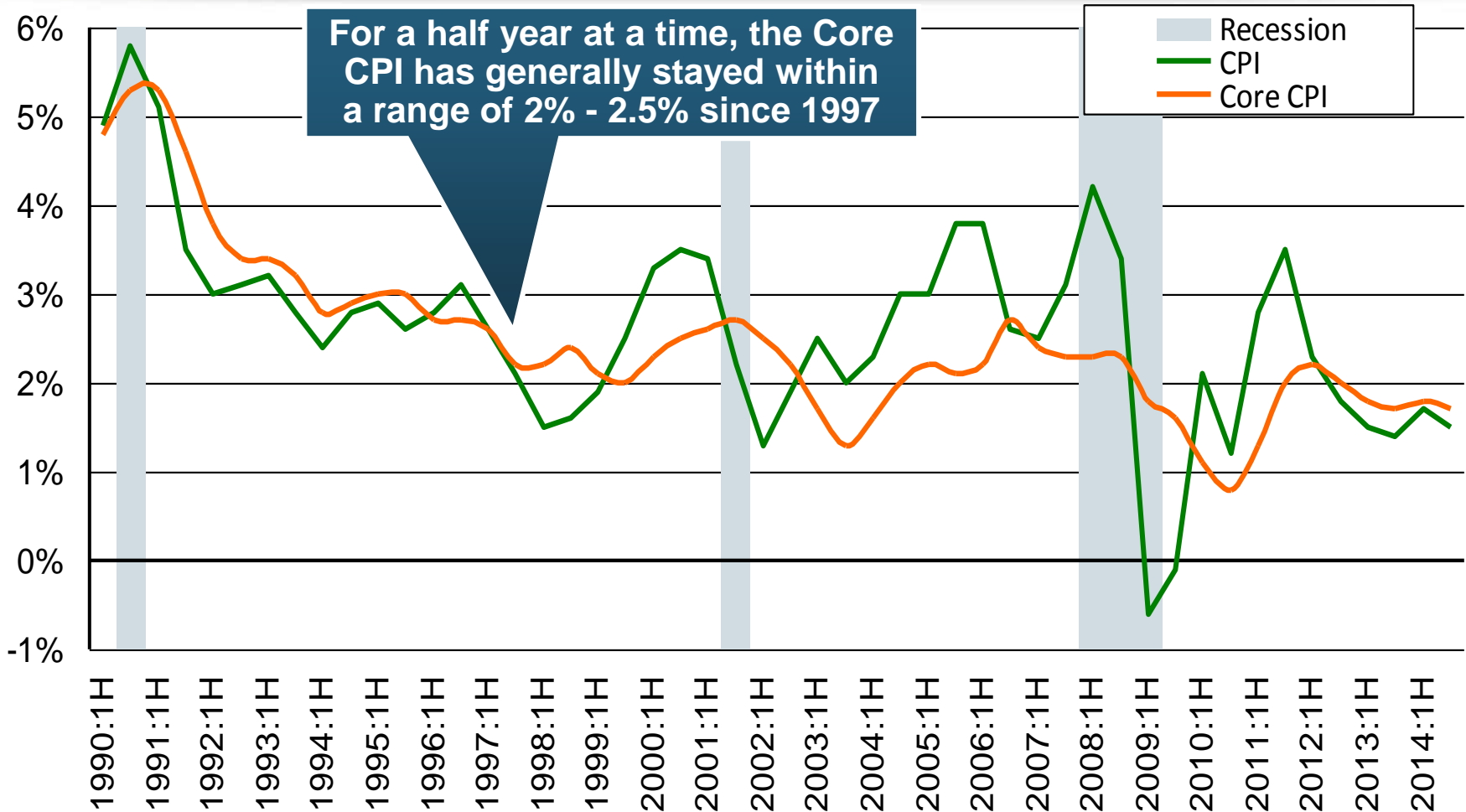
## Leading Inflation

Year-over-year change in the PriceStats daily U.S. inflation index and the consumer-price index



Source: PriceStats, Labor Department | WSJ.com

# Change\* in the Consumer Price Index and Core CPI, 1990–2014, Semi-annually



**Over the last 18 years, prices generally rose about 2% per year.**

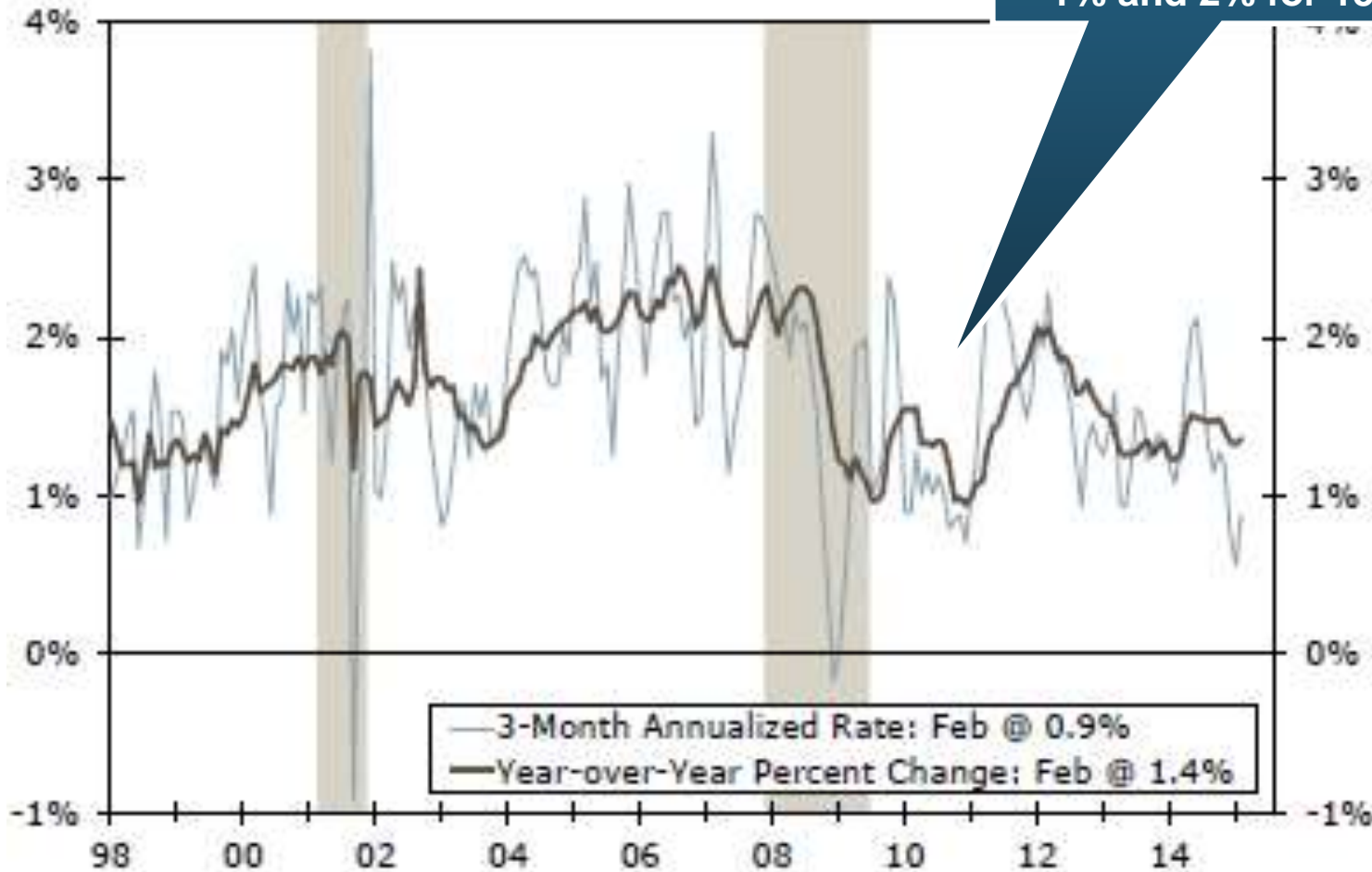
\*Semi-annually, through 2014:2H. Not seasonally adjusted.

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

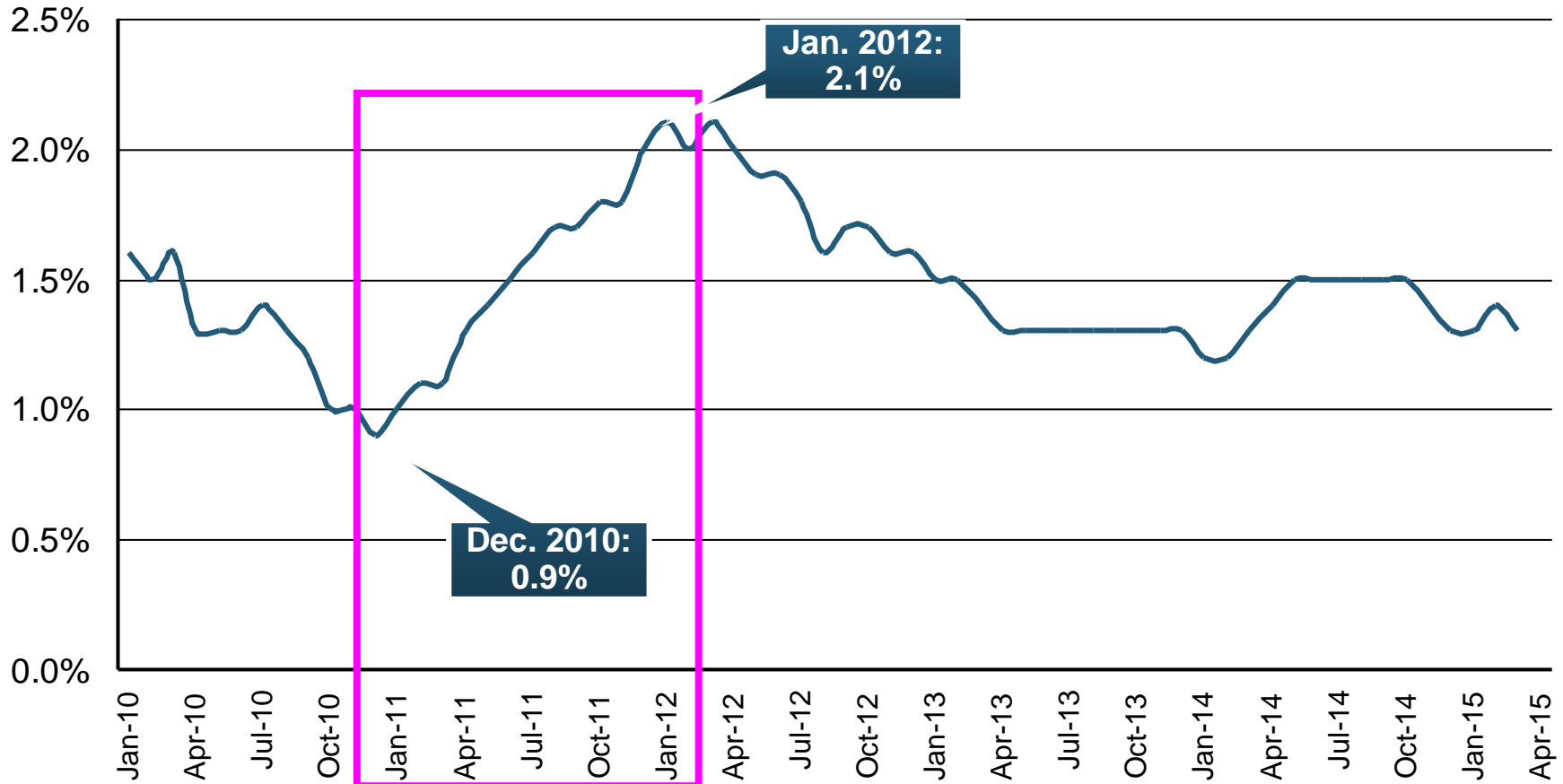
# The PCE Deflator

## Core PCE Deflator

The y-o-y core PCE price index has stayed between 1% and 2% for 15 years

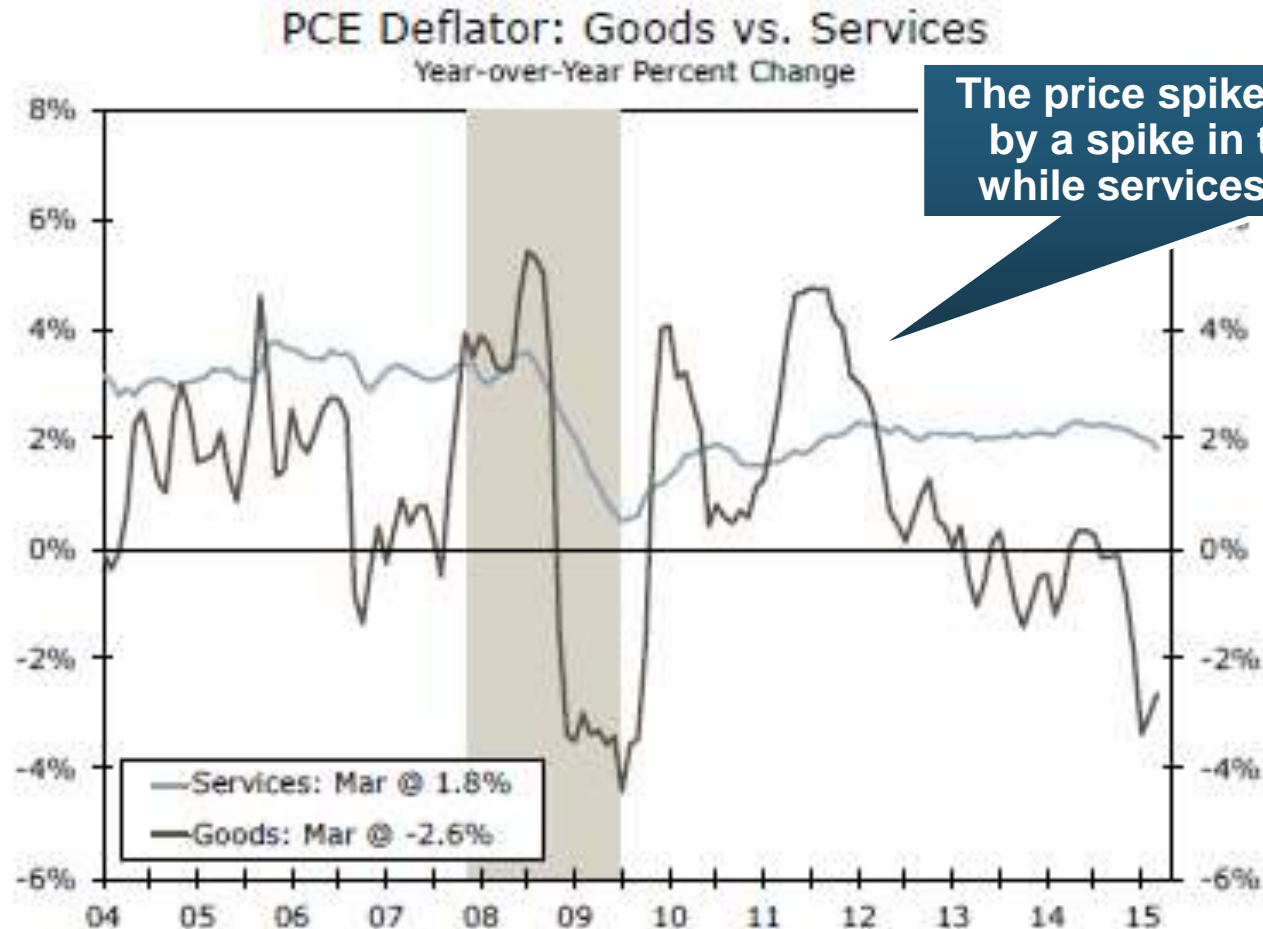


# Y-o-Y Percent Change in Core PCE Price Index, Monthly, 2010–2015



**In December 2010, prices were falling. But the trend of price changes can change fairly quickly, even in a time of weak economic growth. Prices began rising in January 2011 and kept doing so for 13 months.**

# PCE Deflator: Goods vs. Services



The price spike in 2011 was caused by a spike in the price of goods, while services prices were stable

The price index for goods is much more volatile than the price index for services

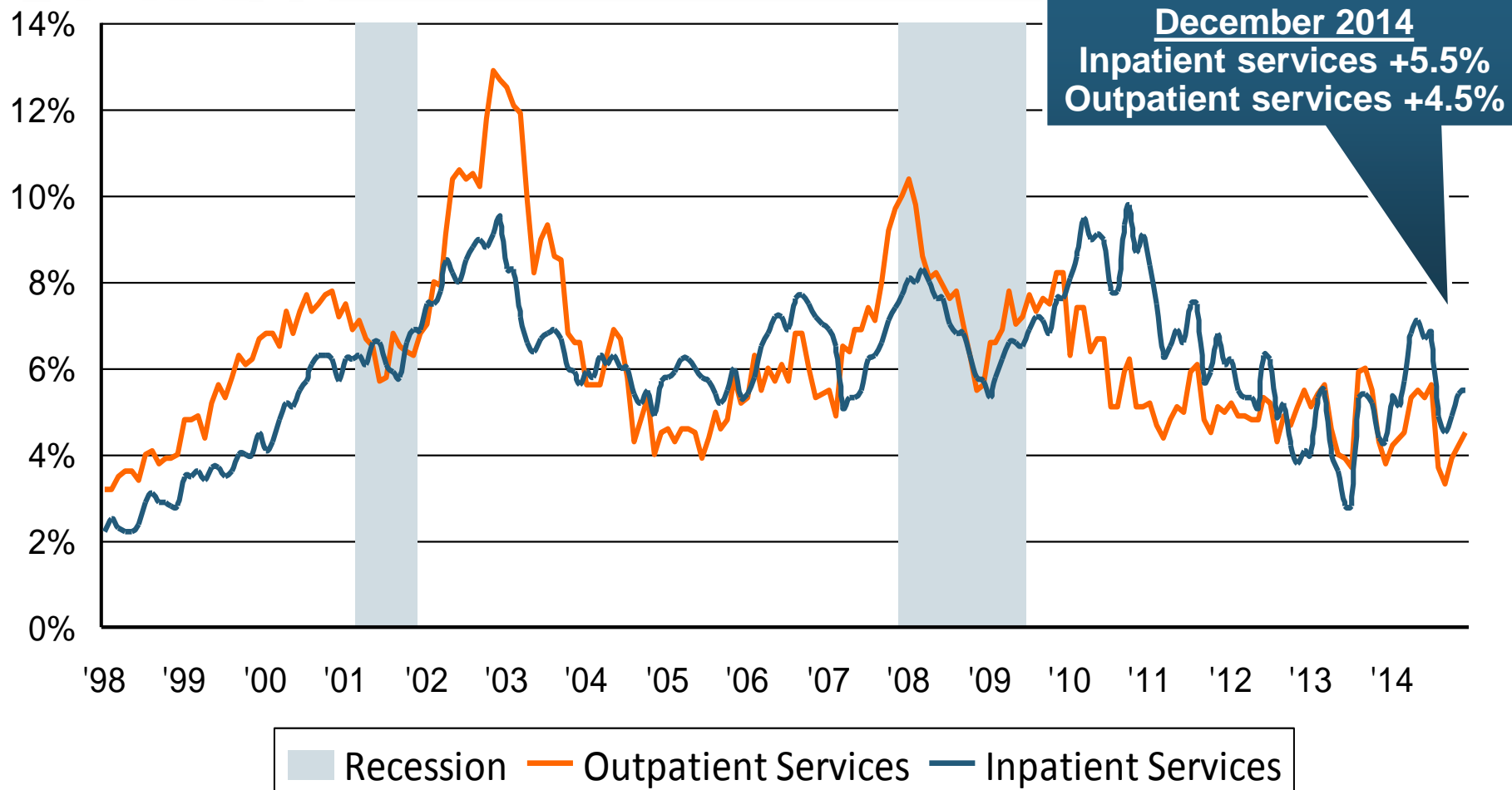


# What About the “Fed’s Printing Money”?

**Shouldn’t We Track Changes in, or the Size of, the Money Supply for Signs of Incipient Inflation?**

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

# Prices for Hospital Services: 12-Month Change,\* 1998–2014



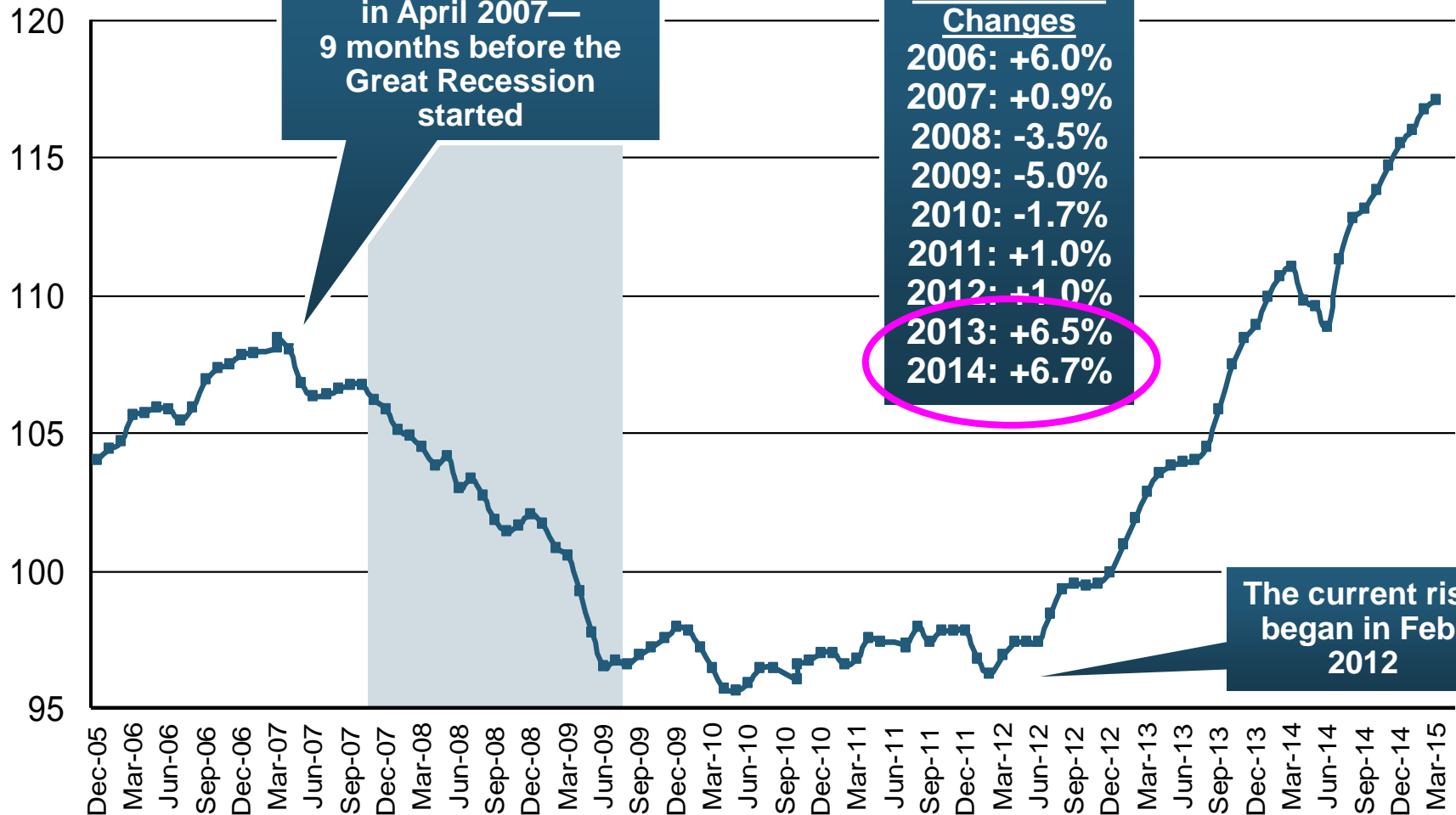
**Prices for Hospital Services have risen at an annual rate of 4% or more for the last 15 years, while the general price level rose by 2%/year.**

\*Percentage change from same month in prior year; through December 2014; 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

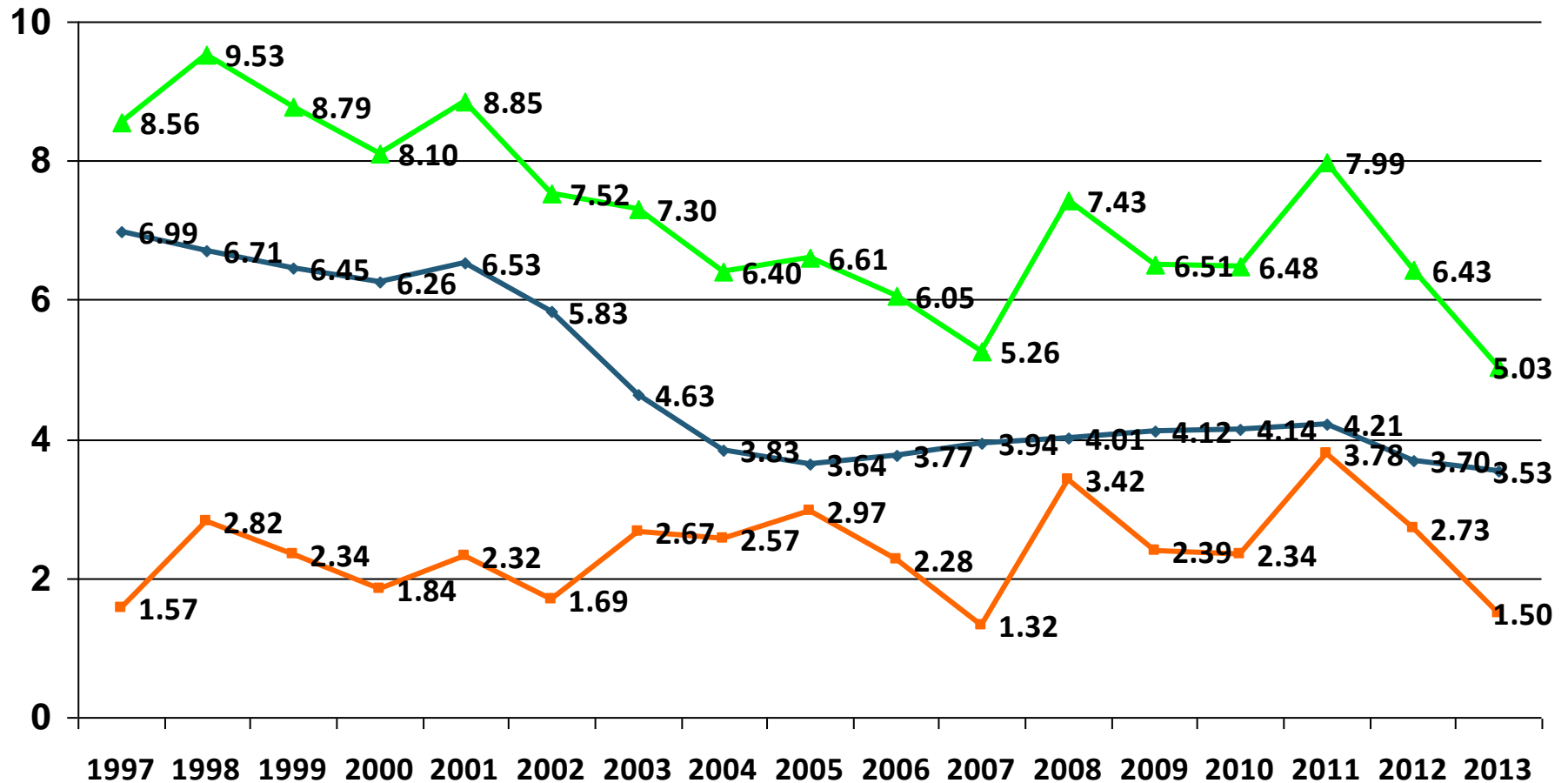


Note: Recession indicated by gray shaded column. Price changes in 2015 are preliminary  
Sources: Census Bureau at <https://www.census.gov/construction/cpi/>; NBER (recession dates); I.I.I.

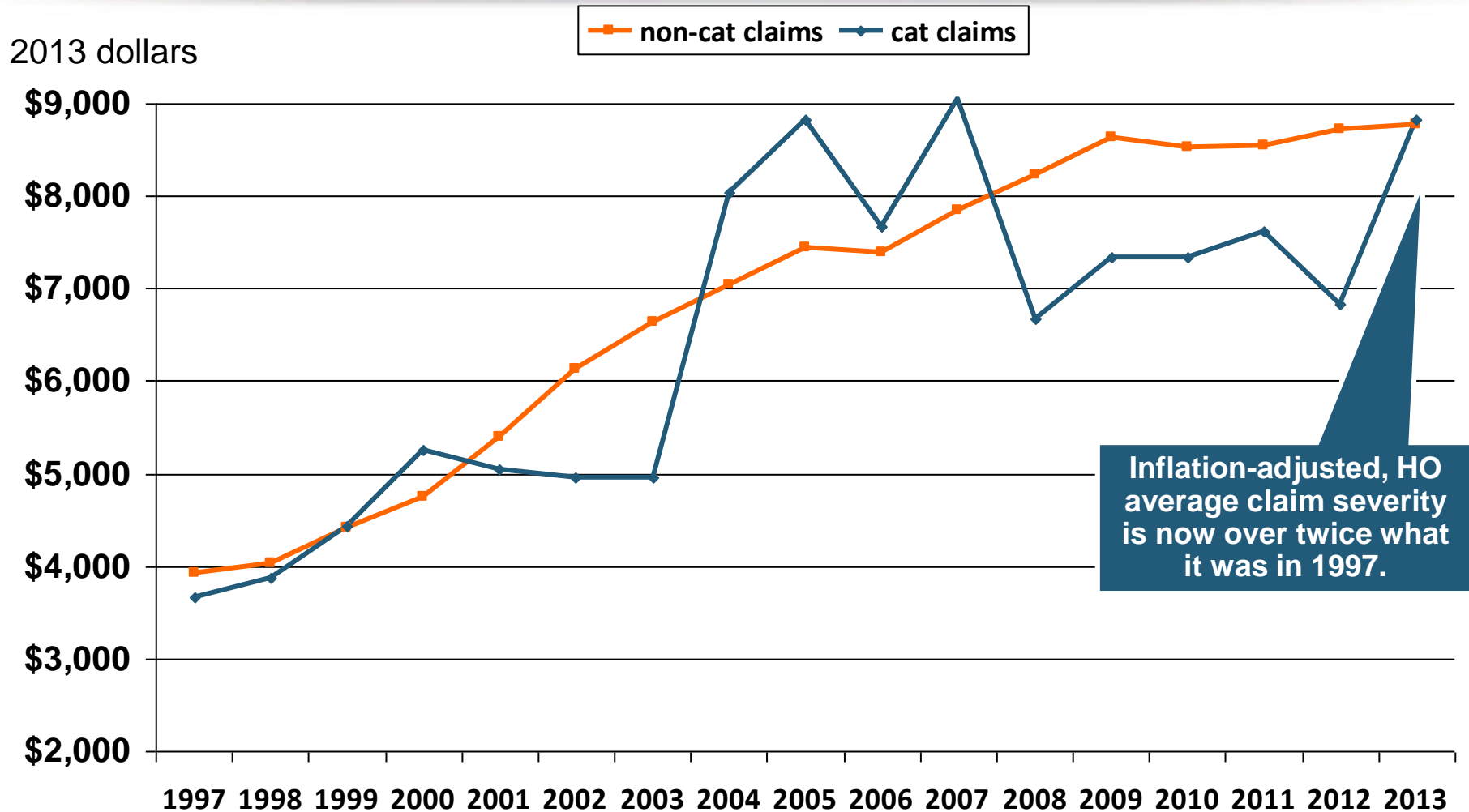
# P/C Industry Homeowners Claim Frequency, US, 1997-2013

Claims Paid per  
100 Exposures

—■ CAT-related claims 
 —◆ Non-CAT-related claims 
 —▲ All Claims



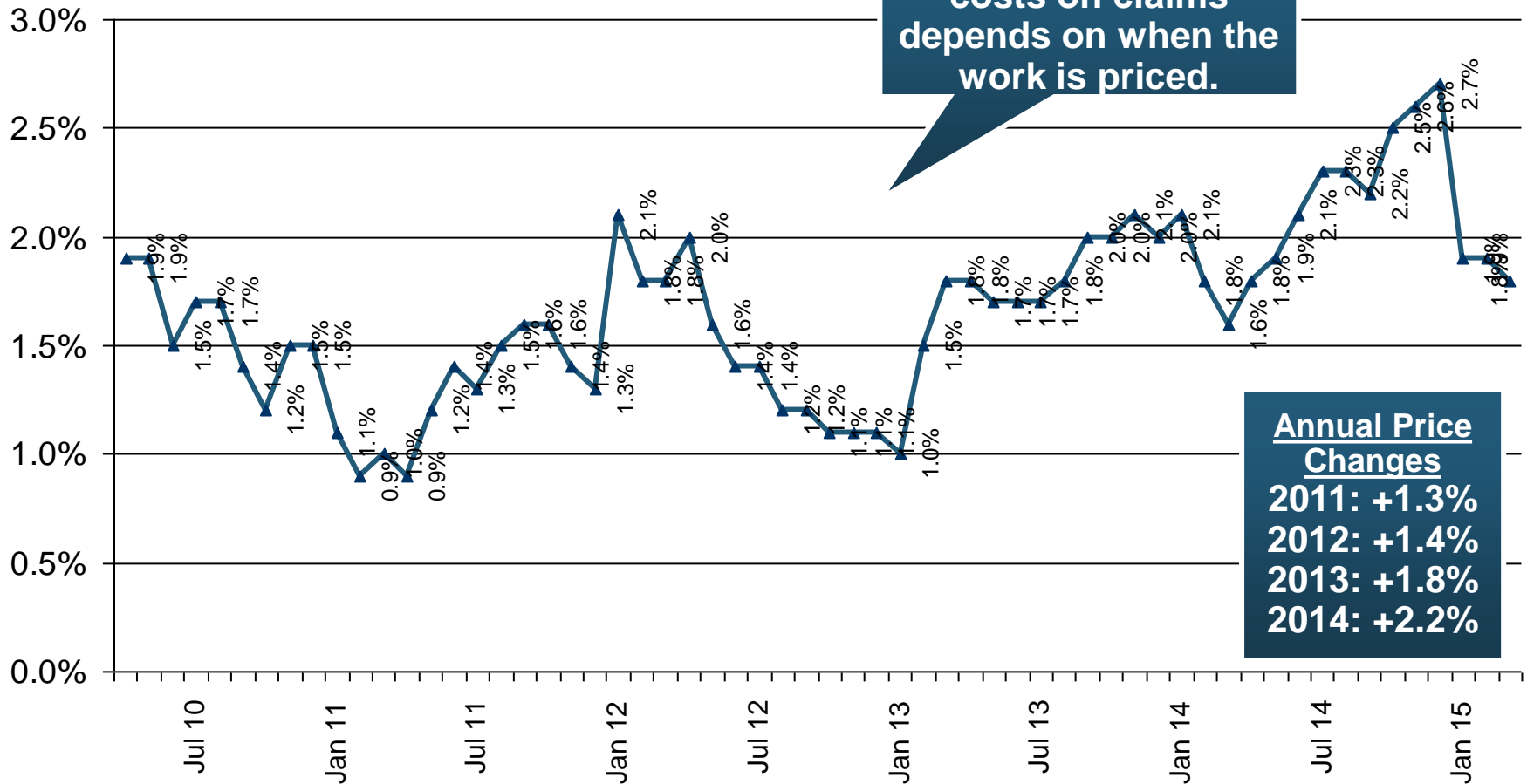
# P/C Industry Homeowners Average Claim Severity, Inflation-adjusted, 1997-2013



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

# Price Changes for Nonresidential Maintenance & Repair, Monthly, 2010-2015

Y-o-Y Price Changes



Prices for nonresidential maintenance & repair have been rising slowly since 2011. Price data for 2015 are preliminary.

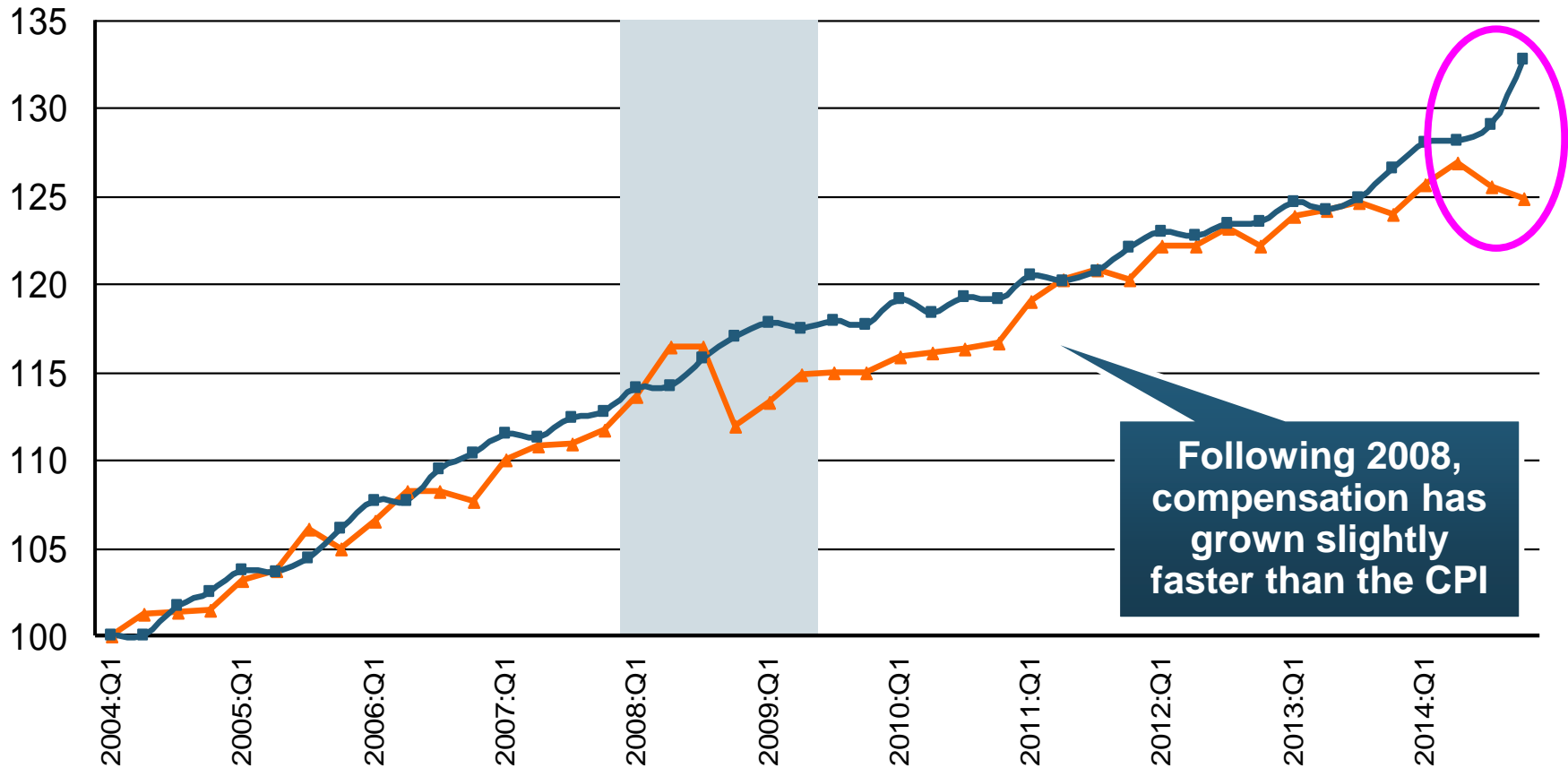
**What about Wage Trends? Isn't that a Major Cause of Inflation?**



# Indexed Cost of Total Compensation per Hour Worked, Quarterly, 2004-2014

Index: 2004:Q1 = 100

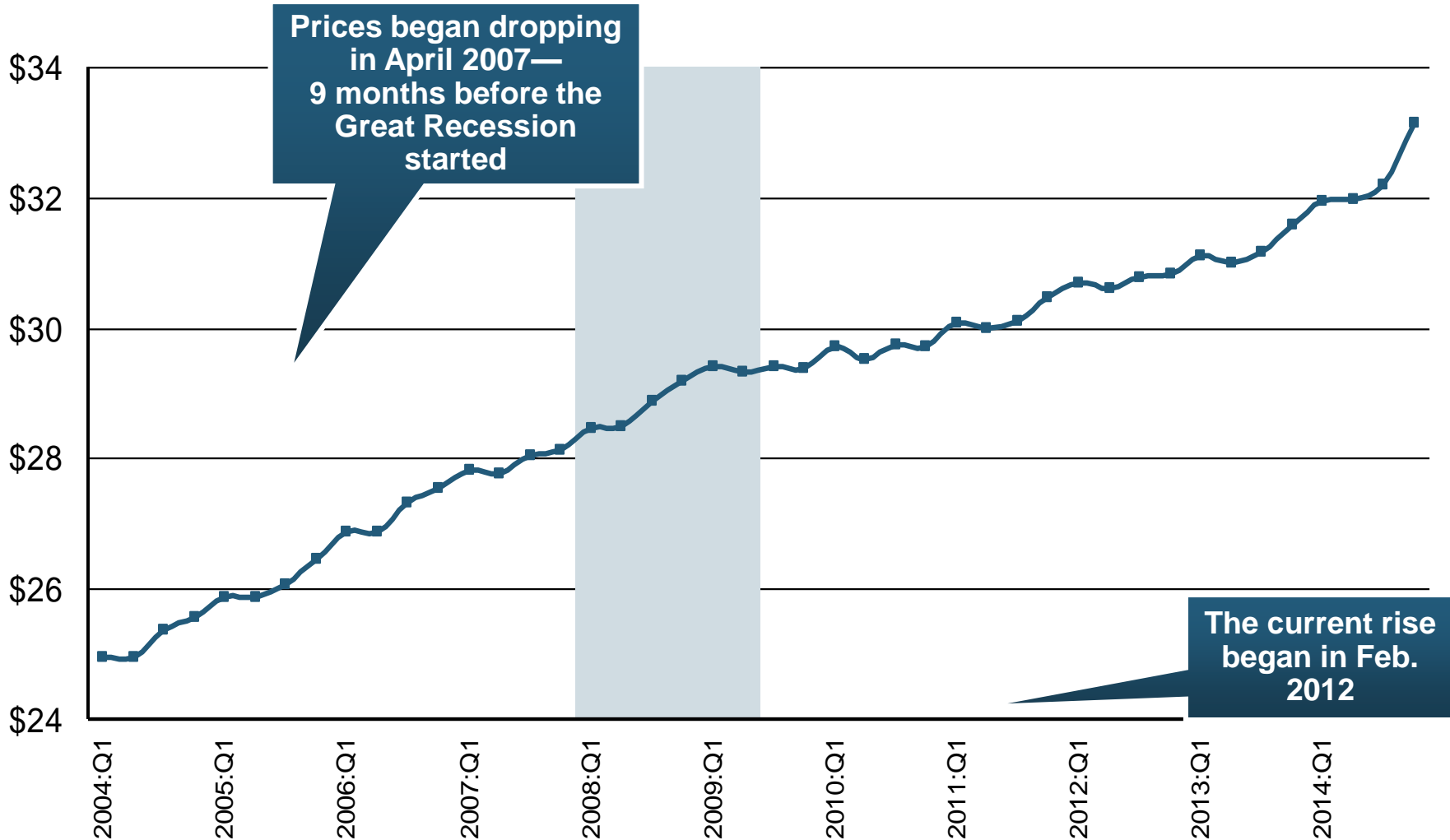
Recession CPI Index



Following 2008, compensation has grown slightly faster than the CPI

Note: Recession indicated by gray shaded column.  
Sources: Bureau of Labor Statistics; NBER (recession dates); I.I.I.

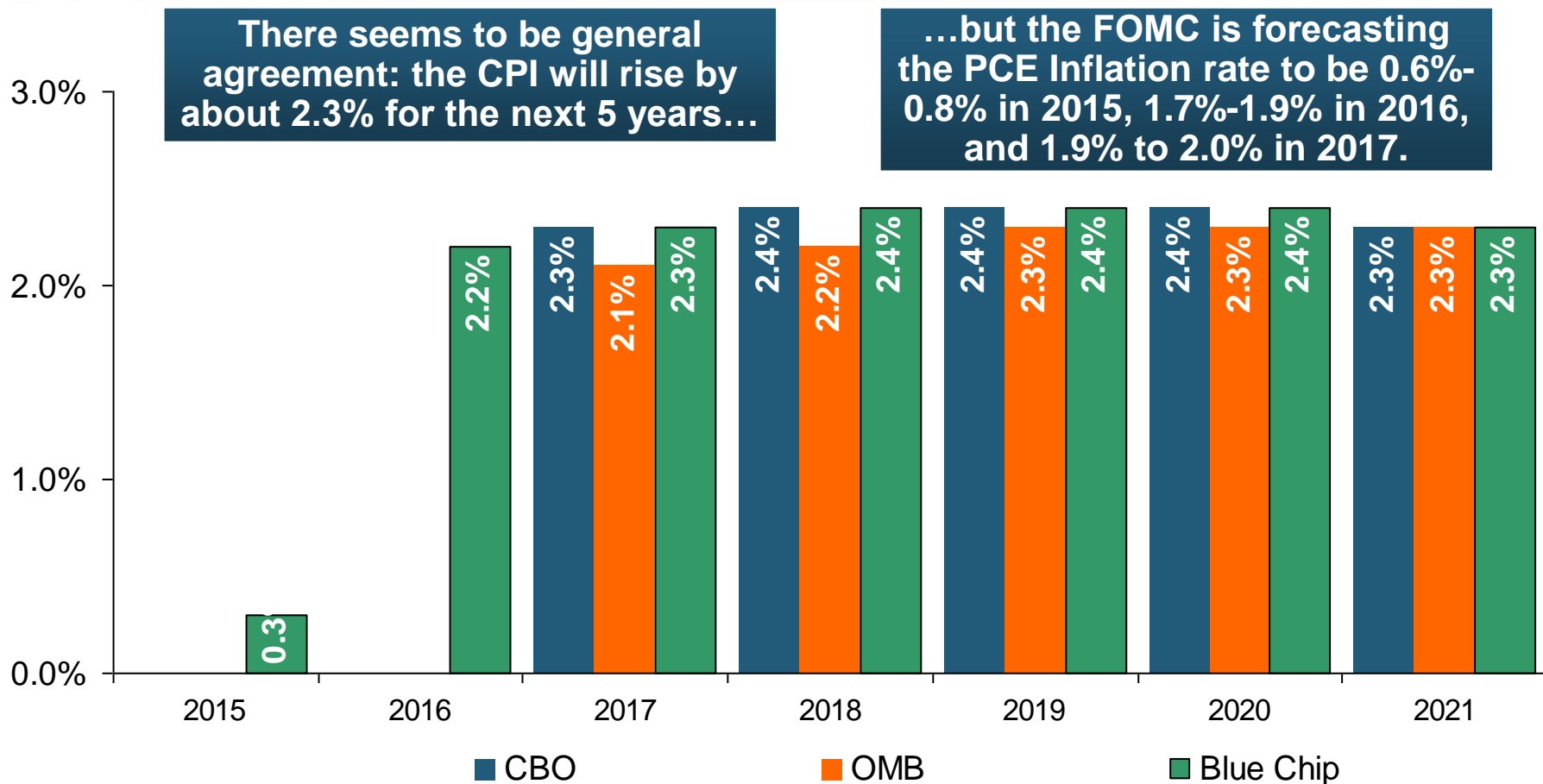
# Cost of Total Compensation per Hour Worked, Quarterly, 2004-2014



Note: Recession indicated by gray shaded column.  
Sources: Bureau of Labor Statistics; NBER (recession dates); I.I.I.

# What's the Best Way to Forecast Future Inflation?

# Inflation Forecasts in Econometric Models, 2015- 2020



**In the Blue Chip survey, the range of CPI forecasts for 2015 is -1.0% to +1.5%. For 2016 it is +1.0% to +3.2%.**

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

At the start of 2013 the bond market thought inflation was likely to rise at a 2.25% clip.

Current expectations are for inflation over the next 5 years are near 1.75% per year.



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).

## Inflation: Back on Solid Ground?

### Inflation Chartbook: May 2015

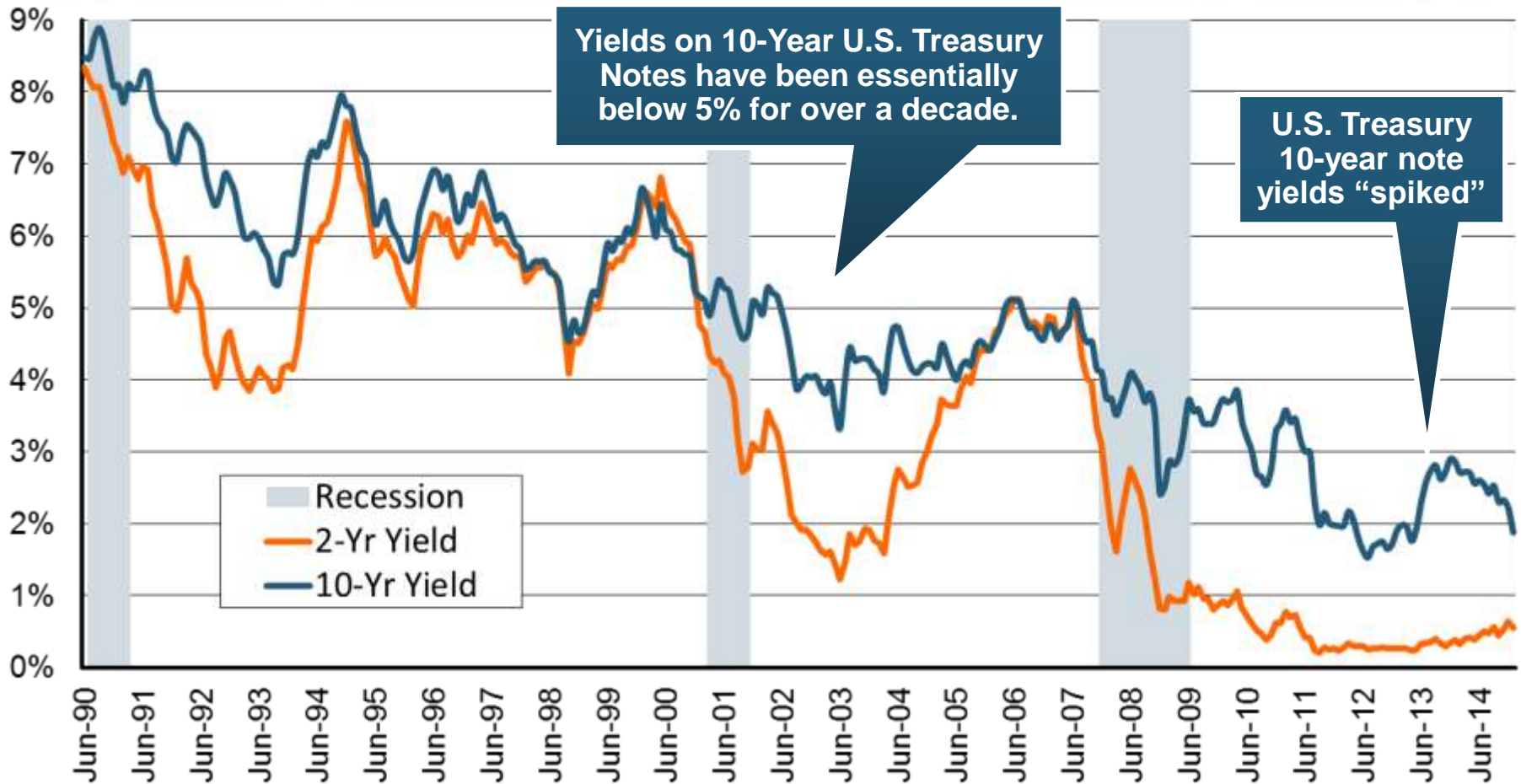
After a short bout of falling prices, inflation appears to be on firmer ground. Inflation by most measures has begun to move up again the past two months, following a string of negative readings that lasted through January. The turnaround has largely been driven by the rebound in energy prices. Since the lows reached in January, oil prices are up more than 30 percent, while gasoline prices according to the Automobile Association of America are up more than 25 percent (Figure 1). The moderate recovery in oil prices and ensuing rise in energy prices have pushed monthly changes in the personal consumption expenditures (PCE) Index and Consumer Price Index (CPI) back into positive territory, supporting the Fed's view that recent weakness would be transitory.

**“Inflation by most measures has begun to move up again the past two months, following a string of negative readings that lasted through January.”**

# 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



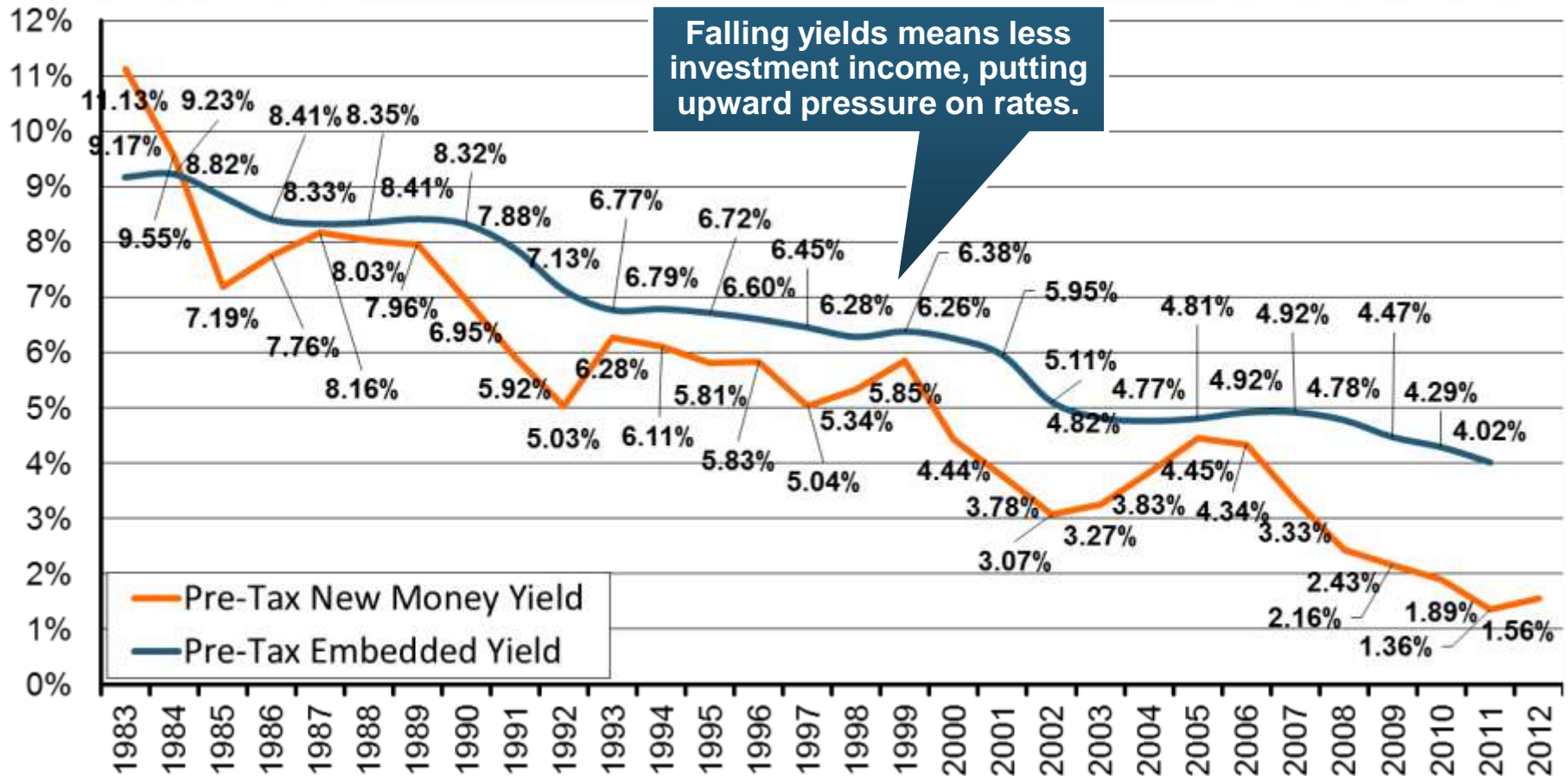
**Since roughly 80% of P/C bond/cash investments are in 10-year or shorter durations, most P/C insurer portfolios will have low-yielding bonds for years to come.**

\*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.

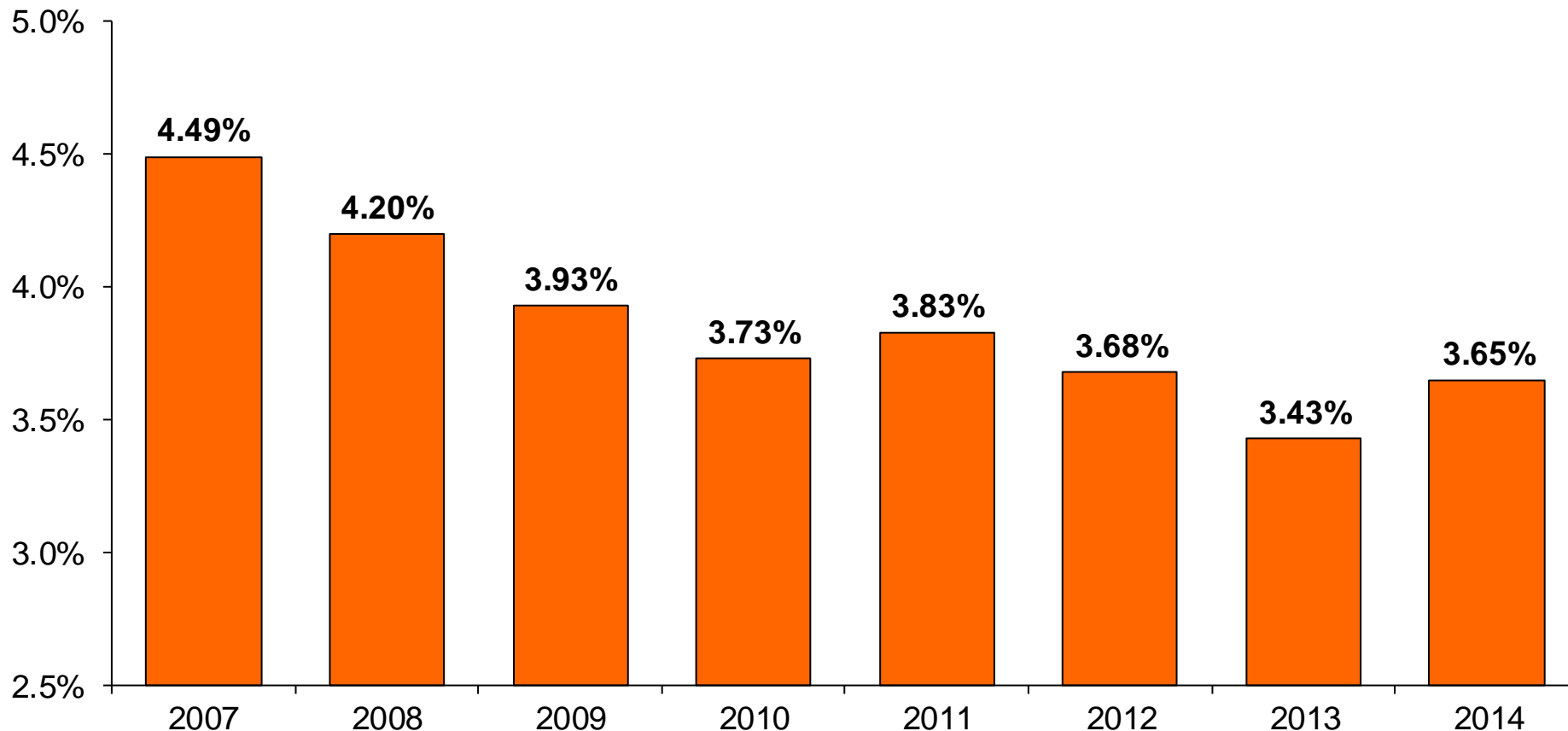


# New Money vs. Embedded Yields, U.S. Insurers, 1983-2012



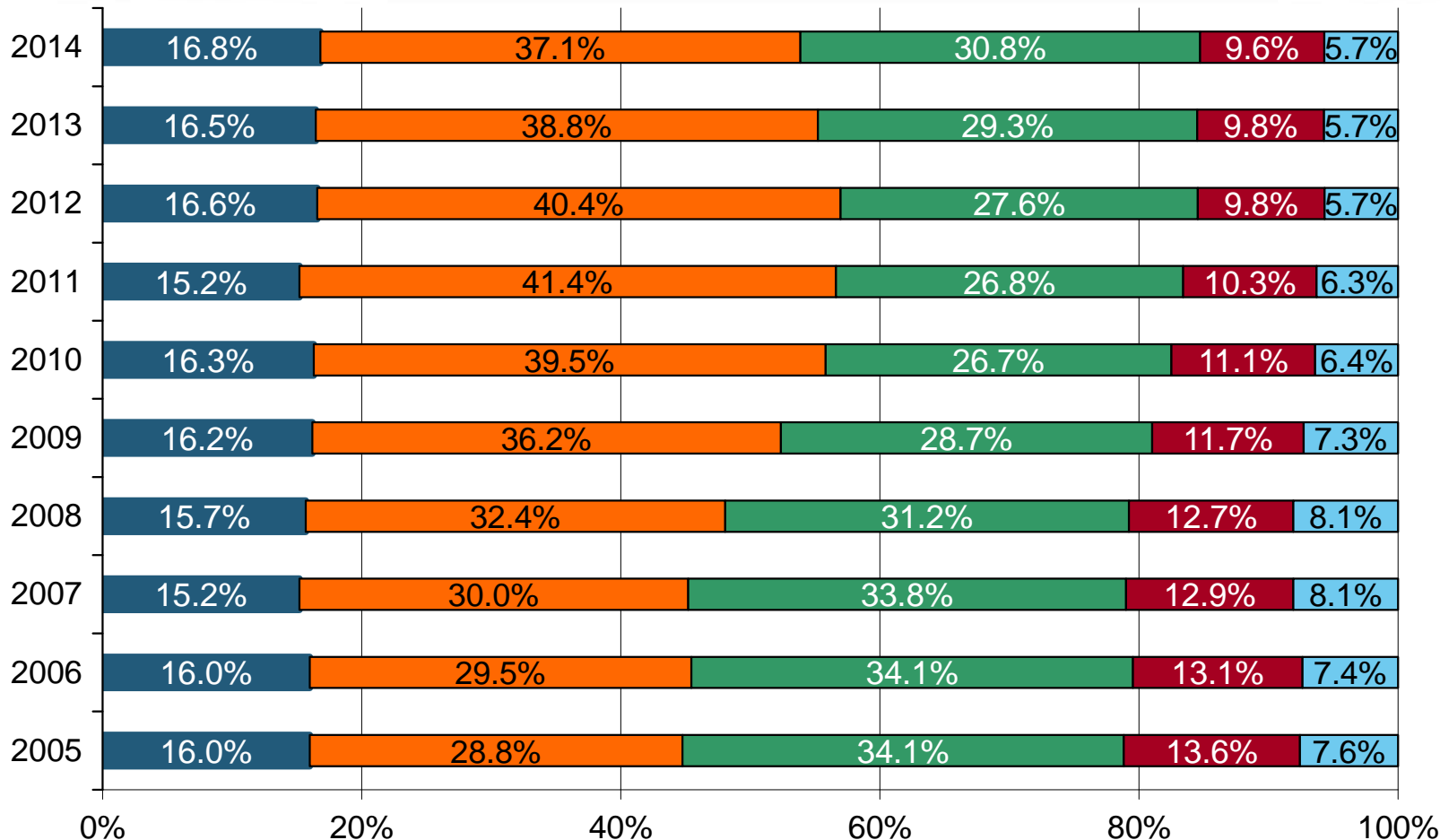
**As long as new money rates are below the rates of maturing bonds, the portfolio yield will continue to sink.**

# Net Yield on P/C Insurer Invested Assets, 2007-2014



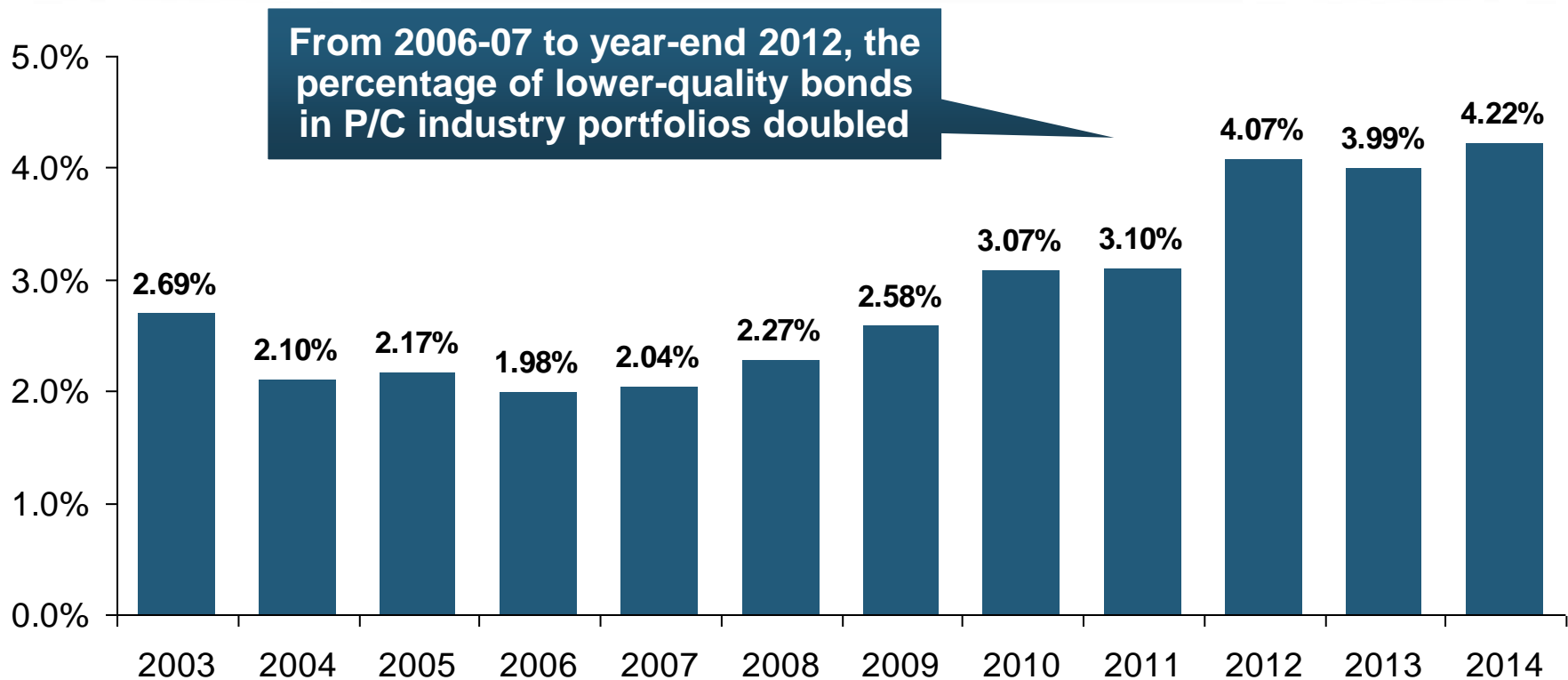
**Since year-end 2007, P/C Insurer net yields dropped by 84 basis points. This downtrend is likely to continue as older, higher-yielding bonds mature and are replaced by lower-yielding ones.**

# 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

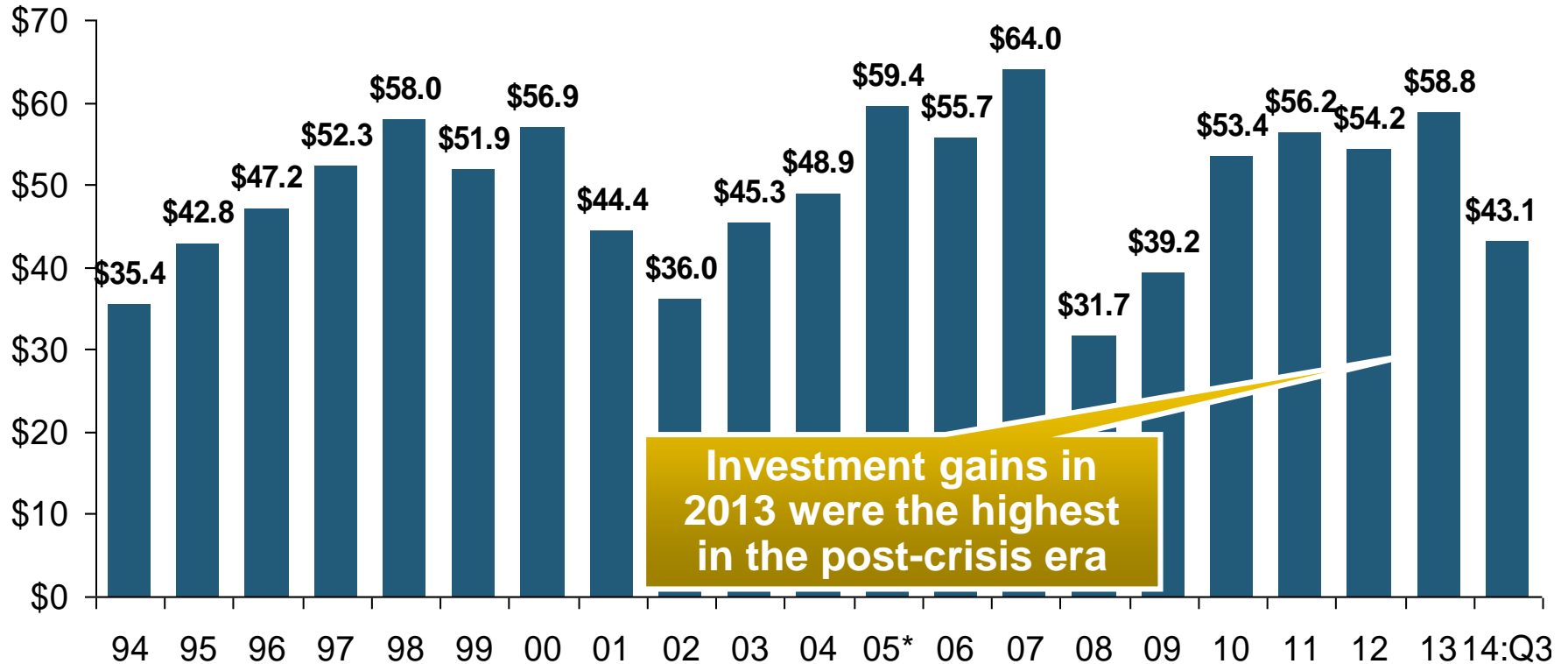


There are many ways to capture higher yields on bond portfolios. One is to accept greater risk, as measured by NAIC bond ratings. The ratings range from 1 to 6, with the highest quality rated 1. Even in 2014, over 95% of the industry's bonds were rated 1 or 2.

Sources: SNL Financial; Insurance Information Institute.

# Property/Casualty Insurance Industry Investment Gain: 1994–2014:Q3<sup>1</sup>

\$ Billions



Investment gains in 2013 were the highest in the post-crisis era

**Low interest rates in 2013 caused investment income to keep falling but realized investment gains were up sharply.**

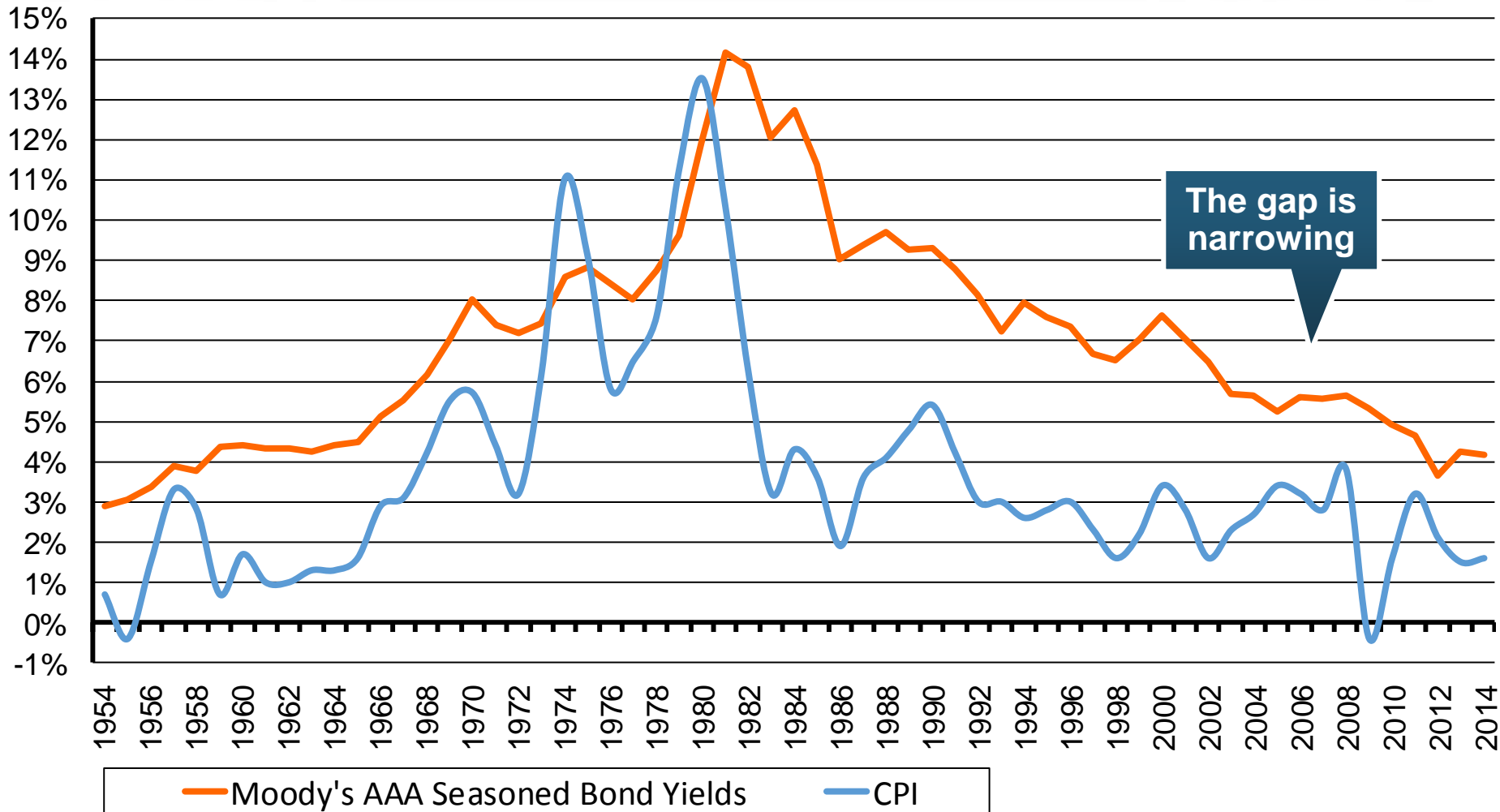
**The financial crisis caused investment gains to fall by 50% in 2008.**

<sup>1</sup> Investment gains consist primarily of interest, stock dividends and realized capital gains and losses.

\* 2005 figure includes special one-time dividend of \$3.2B;

Sources: ISO; Insurance Information Institute.

# Moody's AAA Seasoned Bond Yields vs. CPI, 1954-2014



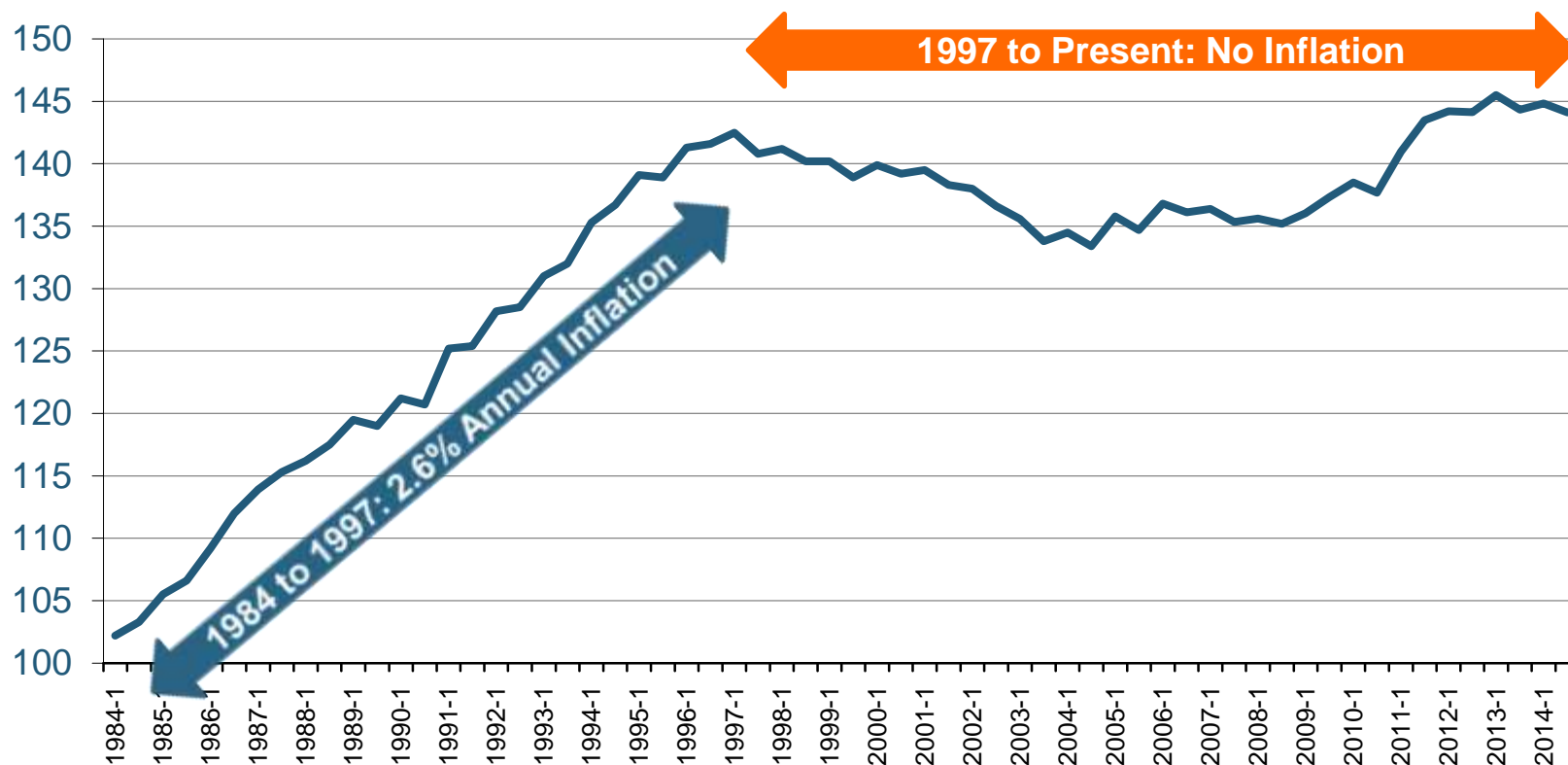
**As a general rule, the CPI trend drives bond yields.**

# 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.**

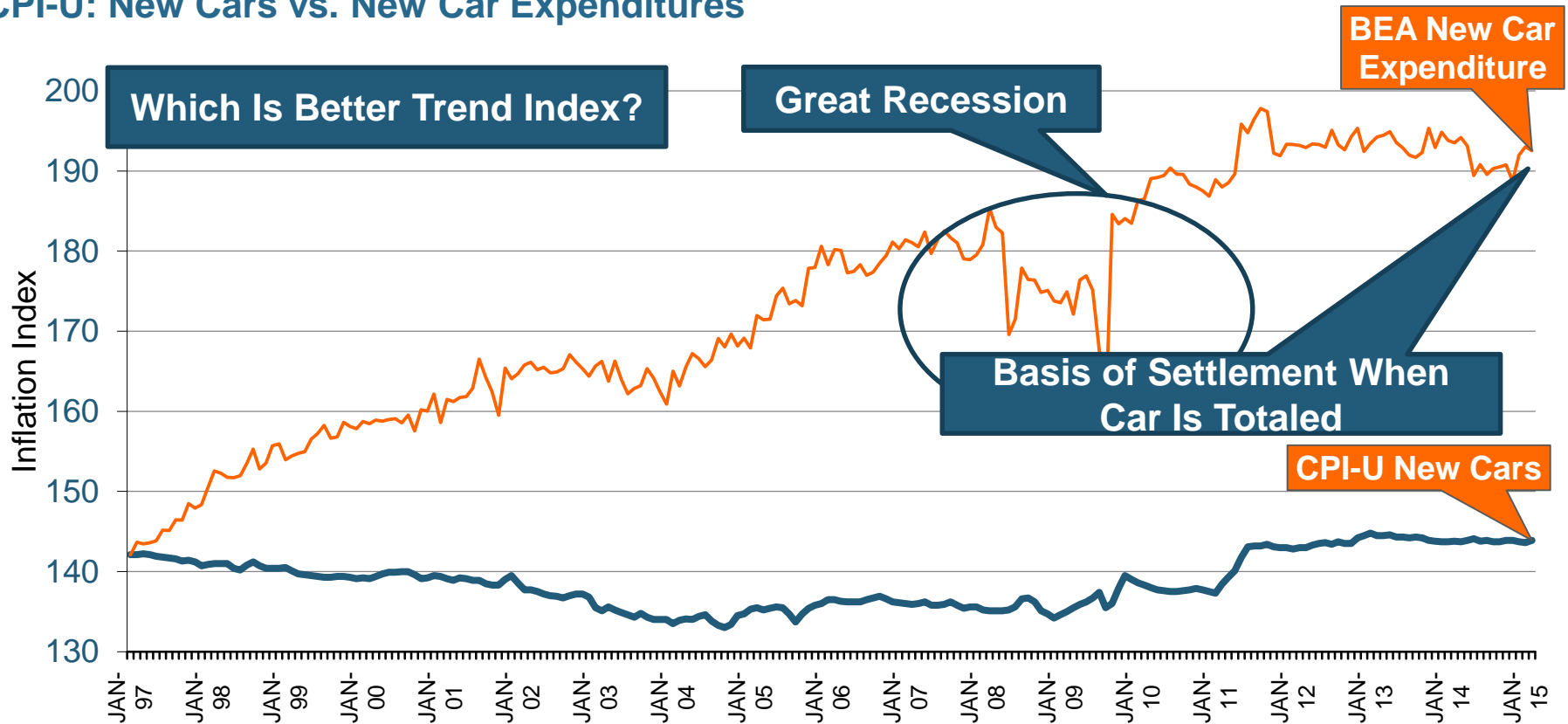
Not Seasonally Adjusted. 1982-84 = 100.

Sources: Bureau of Labor Statistics, Insurance Information Institute.



# Inflation in Auto Prices

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

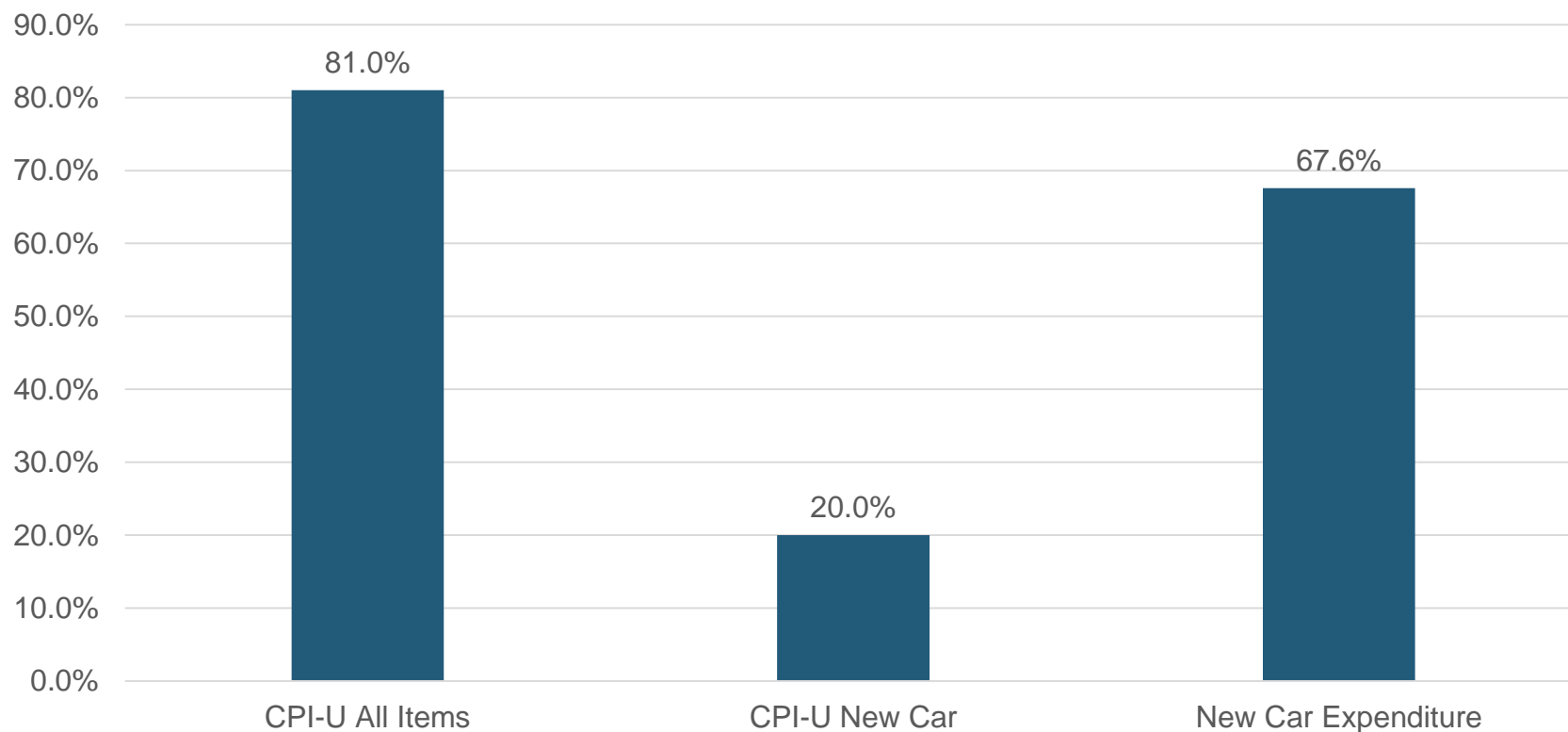


**According to Government, Auto Prices Have Been 'Flat' for Nearly Two Decades. But New Car Expenditures Are Up 35%.**

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



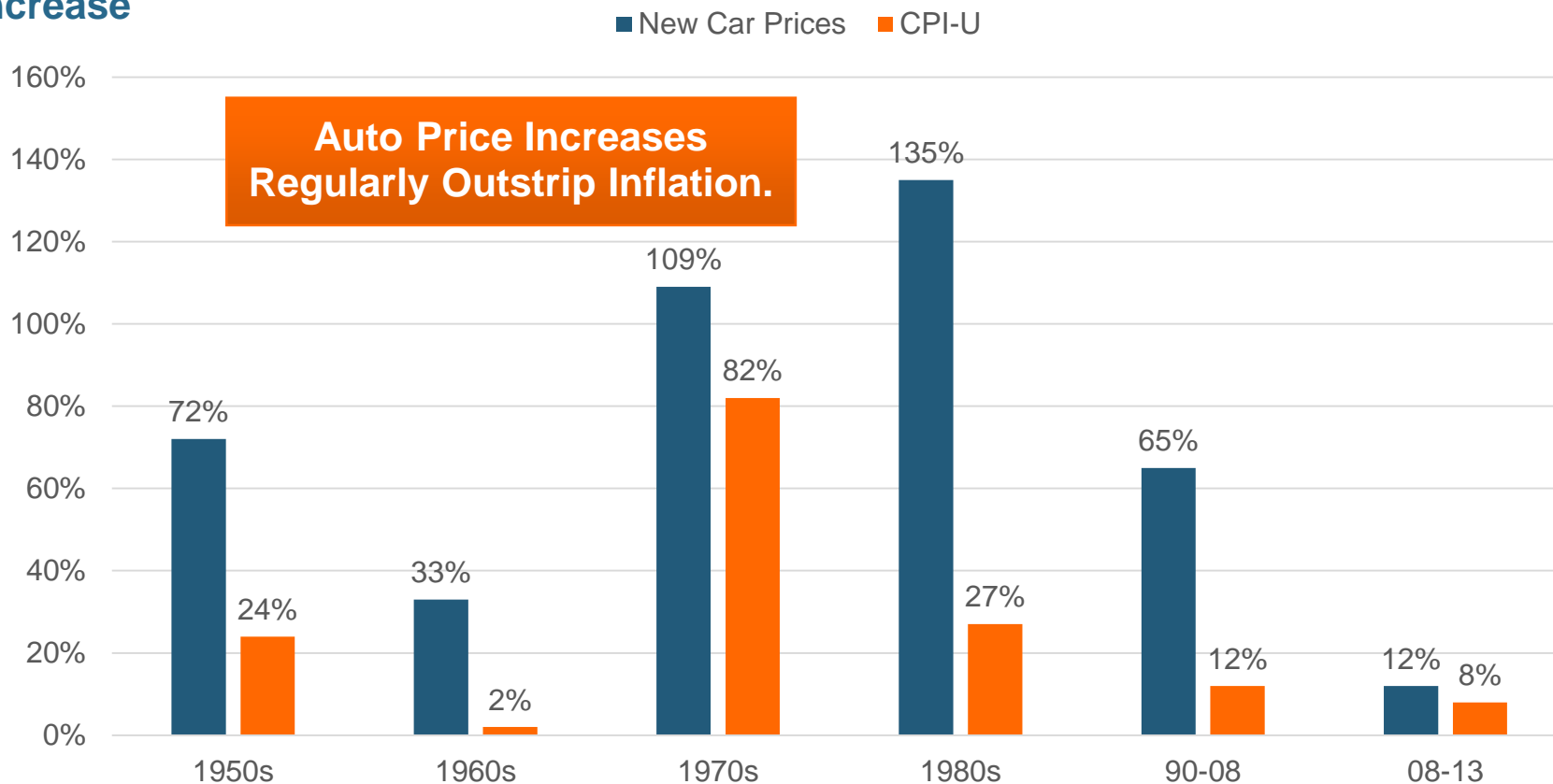
**From 1990 to 2013, Actual New Car Prices Rose Three Times Faster Than New Car Inflation Rate.**

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

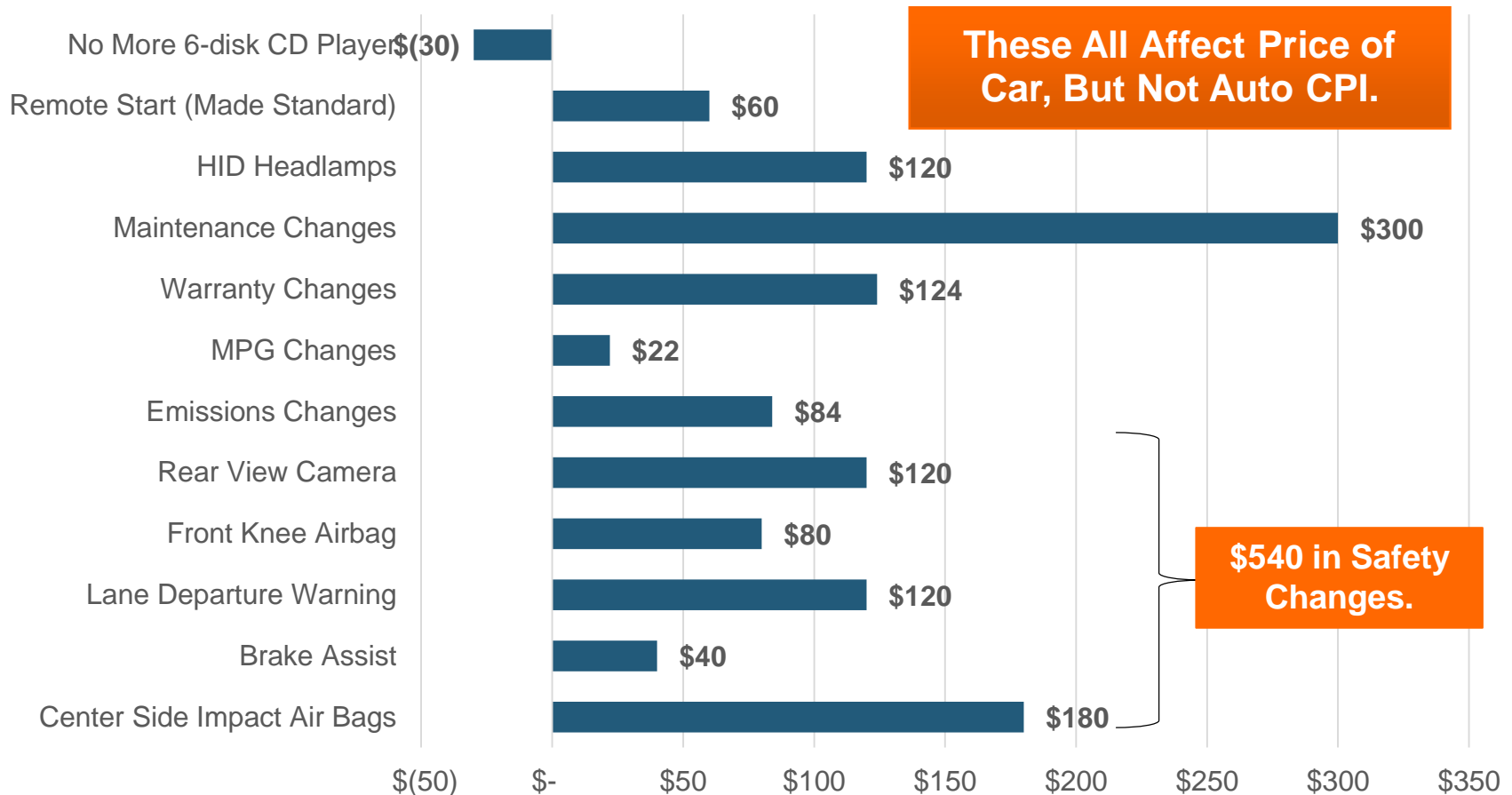
## ■ Durability

- ◆ Stronger Bumpers
- ◆ Flexible Body Panels

## ■ Comfort/convenience Changes

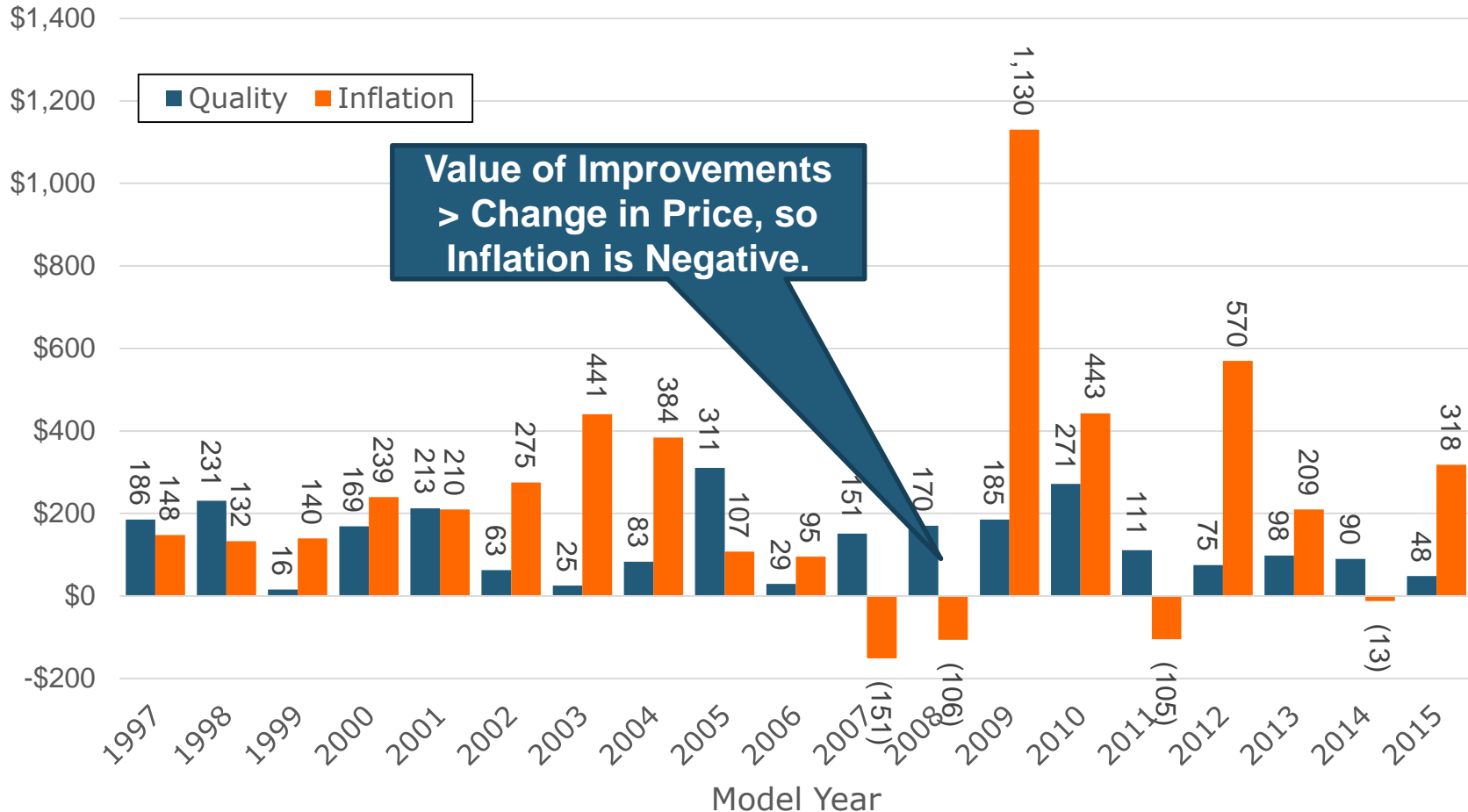
- ◆ Remote Door Locks
- ◆ GPS Systems

# 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!

- Trend Is Always Higher Than Inflation



# Inflation vs. Trend (The Sequel)

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

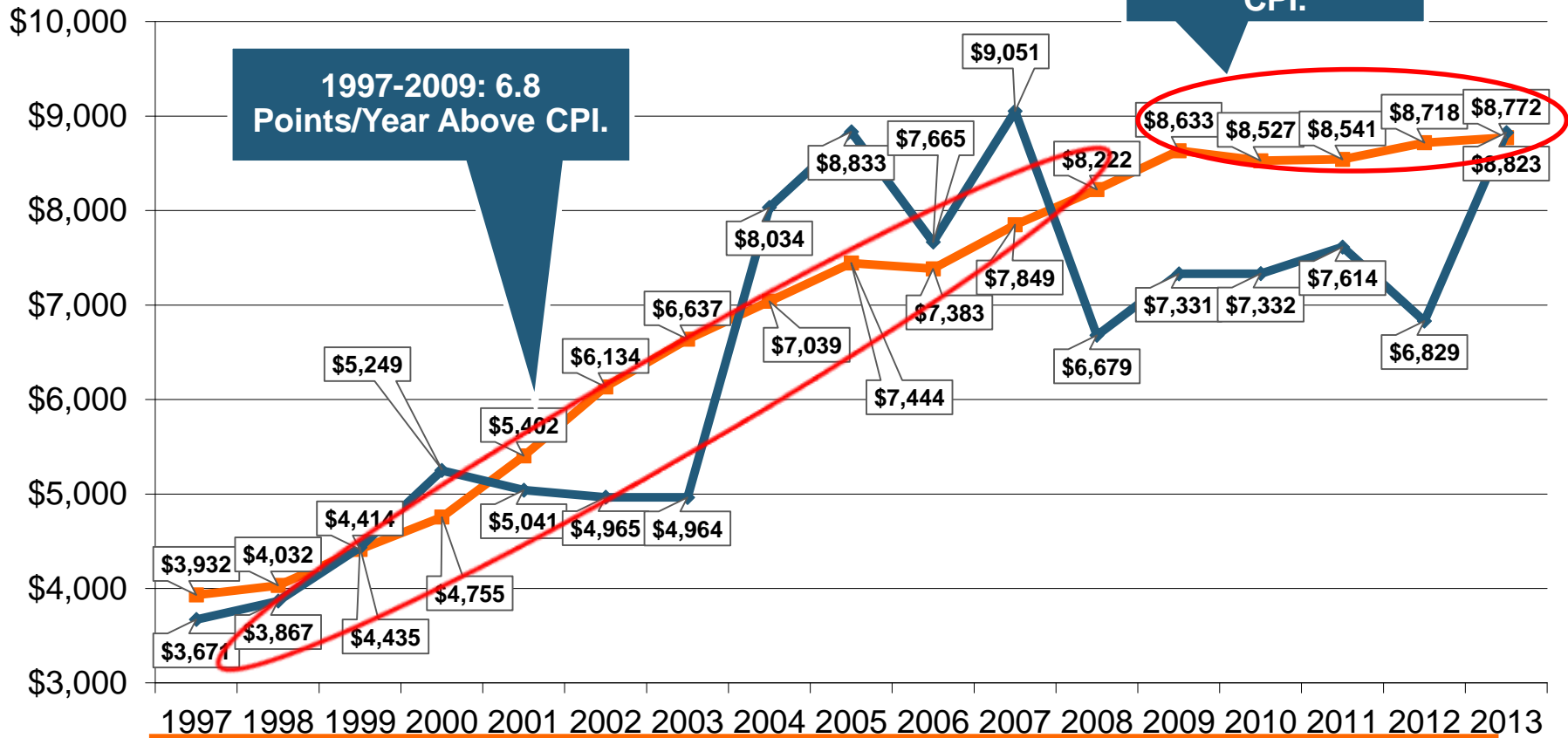
# An Example: Homeowners

Paid Severity in 2013 dollars

— non-cat claims — cat claims

Since 2009: 0.3 Points/Yr Above CPI.

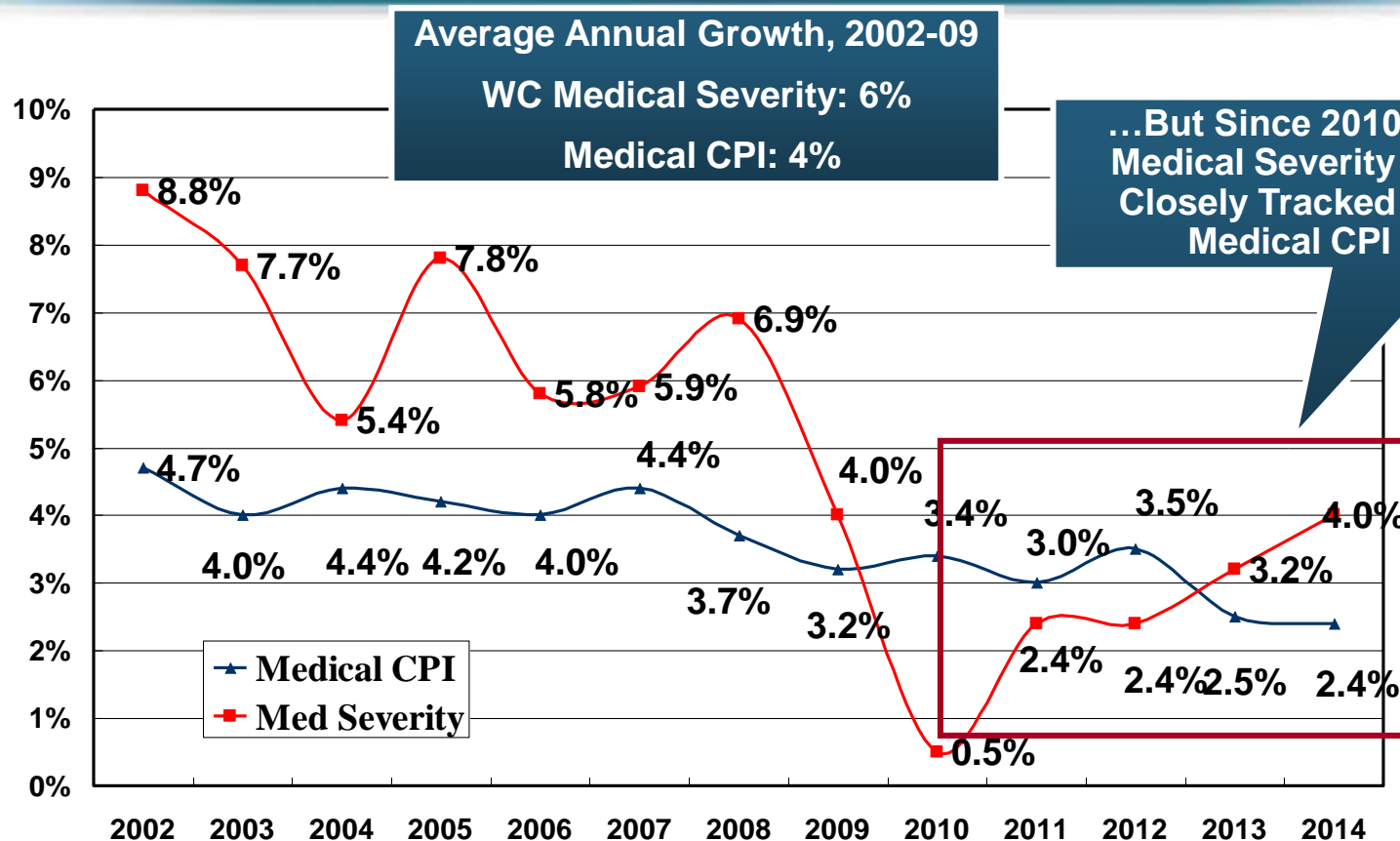
1997-2009: 6.8 Points/Year Above CPI.



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

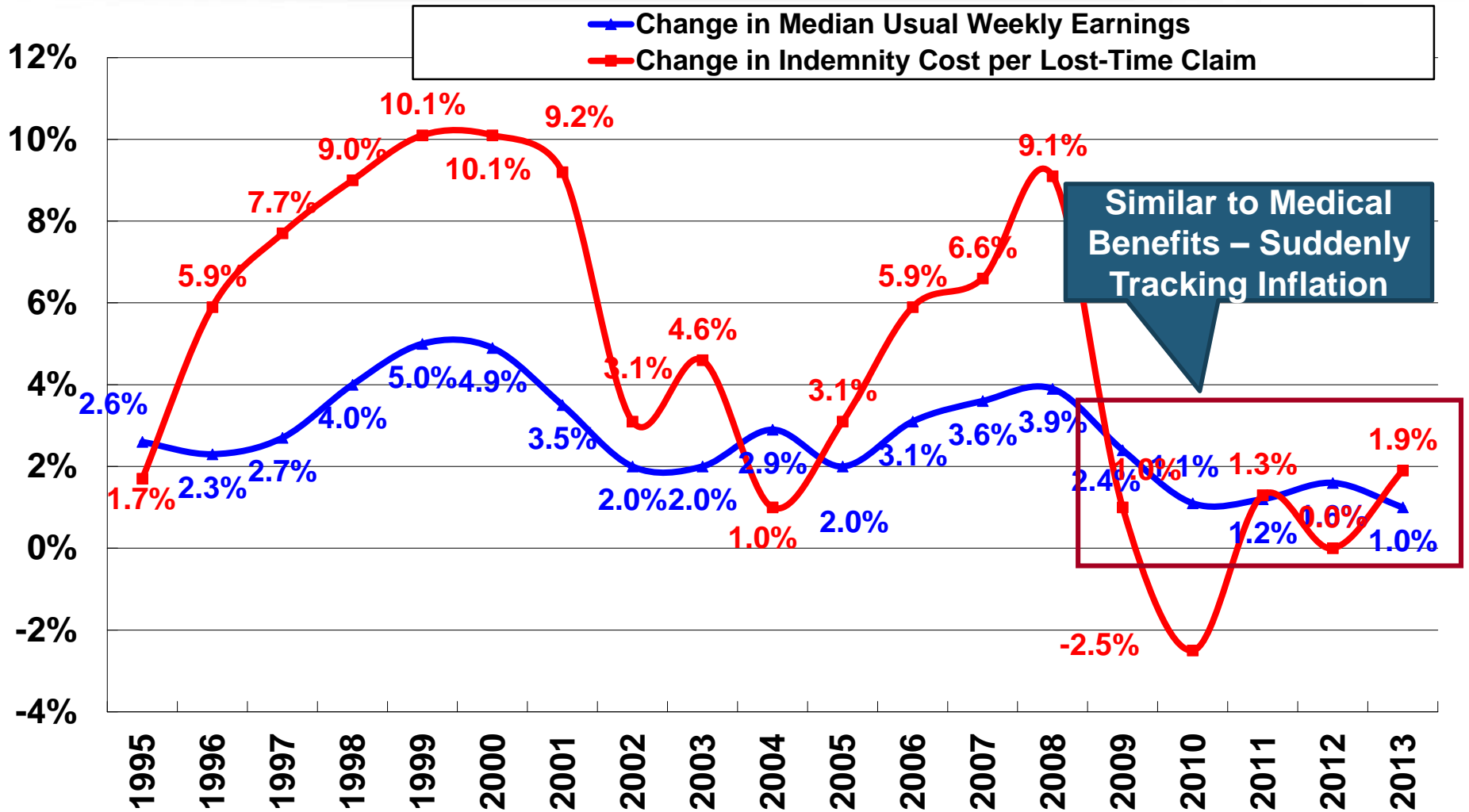
Sources: Insurance Research Council, "Trends in Homeowners Insurance Claims," 2015 edition, p. 41; BLS inflation calculator, with Insurance Information Institute calculations

# Another Example: WC Medical



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

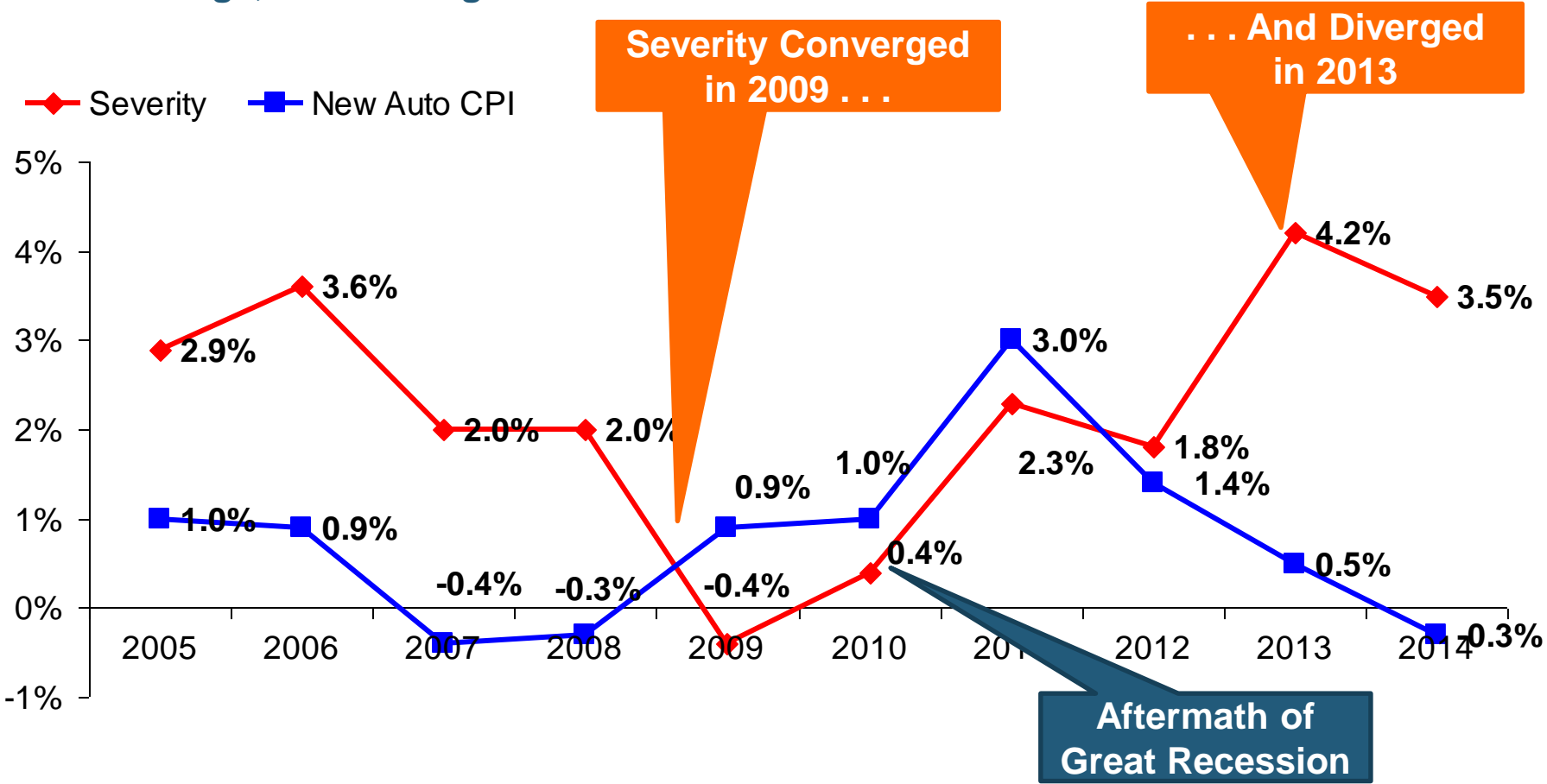
# Another Example: WC Indemnity



NCCI data on WC severity is based on the states where NCCI provides ratemaking services. Excludes the effects of deductible policies.  
Sources: NCCI, BLS, from Current Population Survey.

# And One Last Example: PD Liability

Annual Change, 2005 through 2014



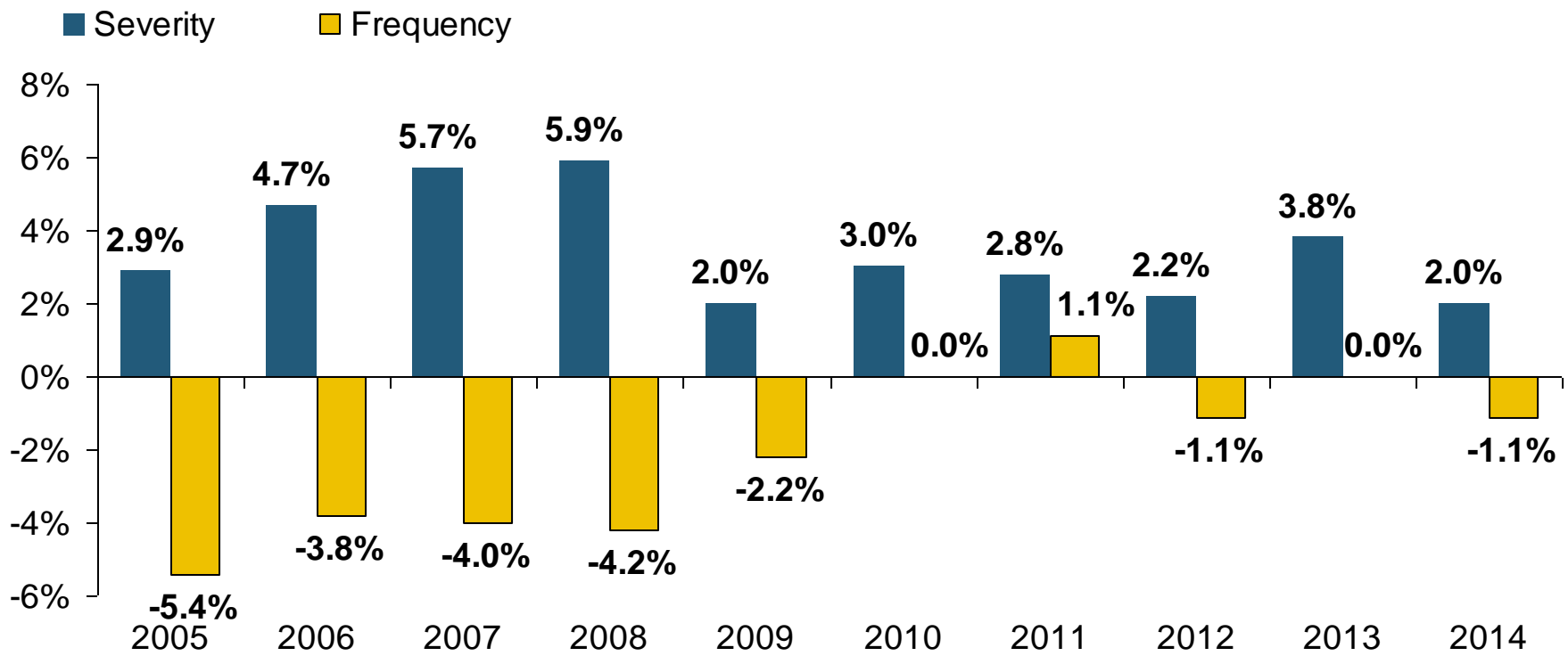
Source: ISO/PCI *Fast Track* data, Bureau of Labor Statistics, Insurance Information Institute.

# 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?

# Bodily Injury: Severity, Frequency Trend Are Moderating

Annual Change, 2005 through 2014

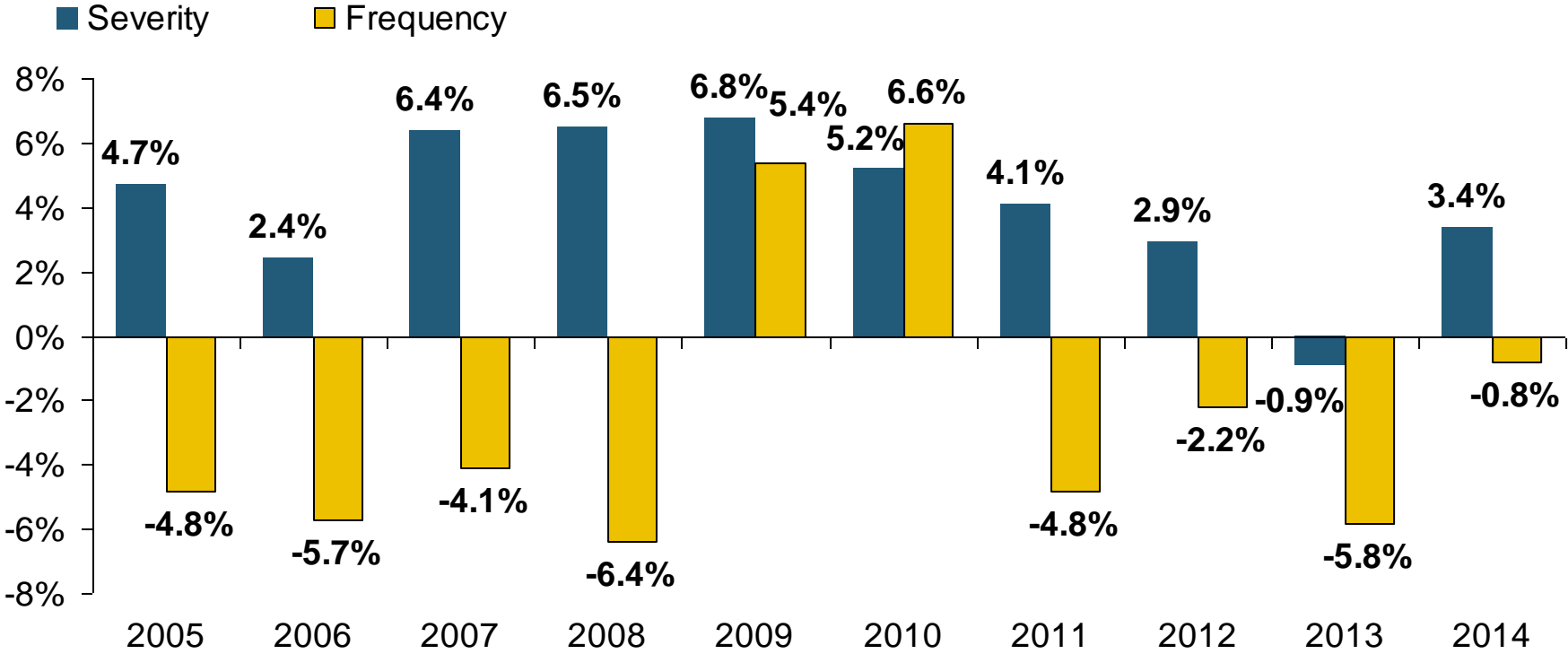


**Cost Pressures Will Increase if BI Severity Increases Continue or Frequency Ticks Up**

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

# No-Fault (PIP) Liability: Adverse Trends May Be Moderating\*

Annual Change, 2005 through 2014



**Multiple States Have Experienced Severe Fraud and 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.

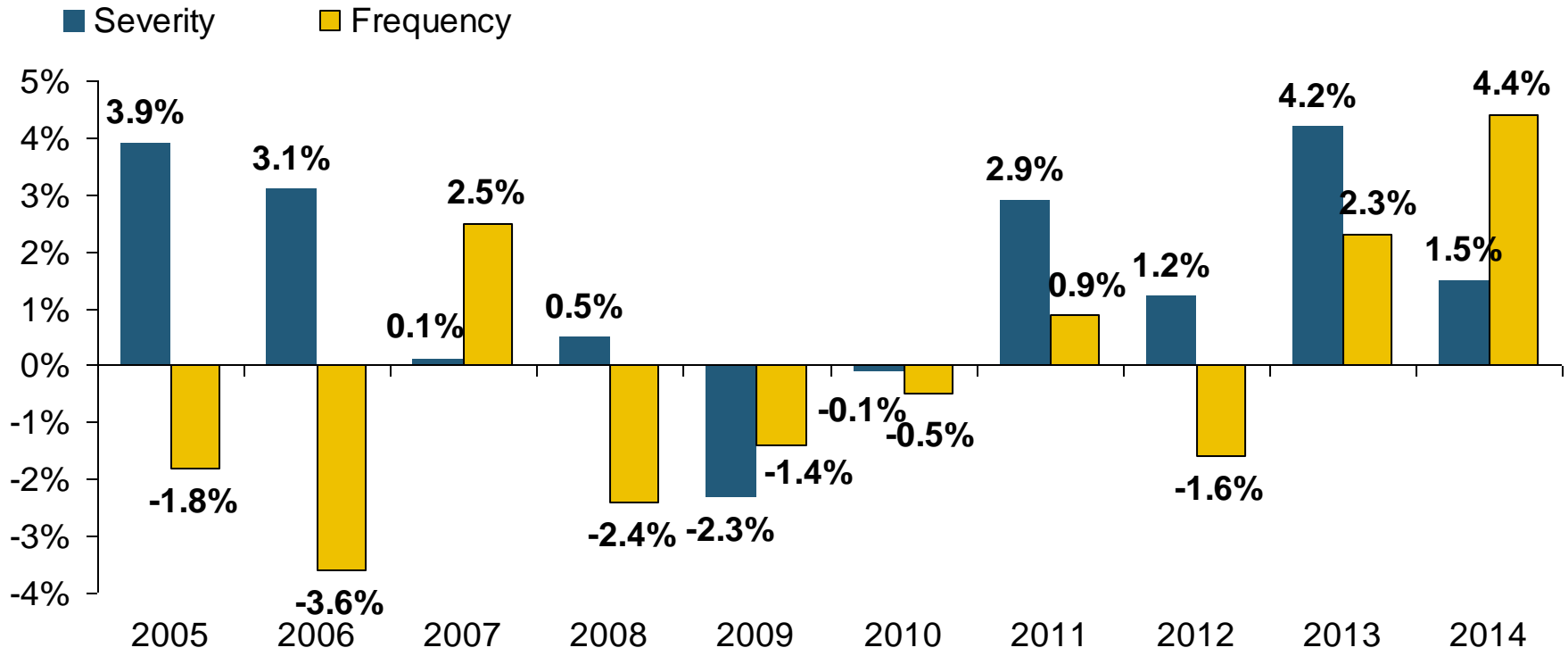
Source: ISO/PCI *Fast Track* data; Insurance Information Institute



# Collision Coverage: Severity & Frequency Trends Are Both Rising



Annual Change, 2005 through 2014

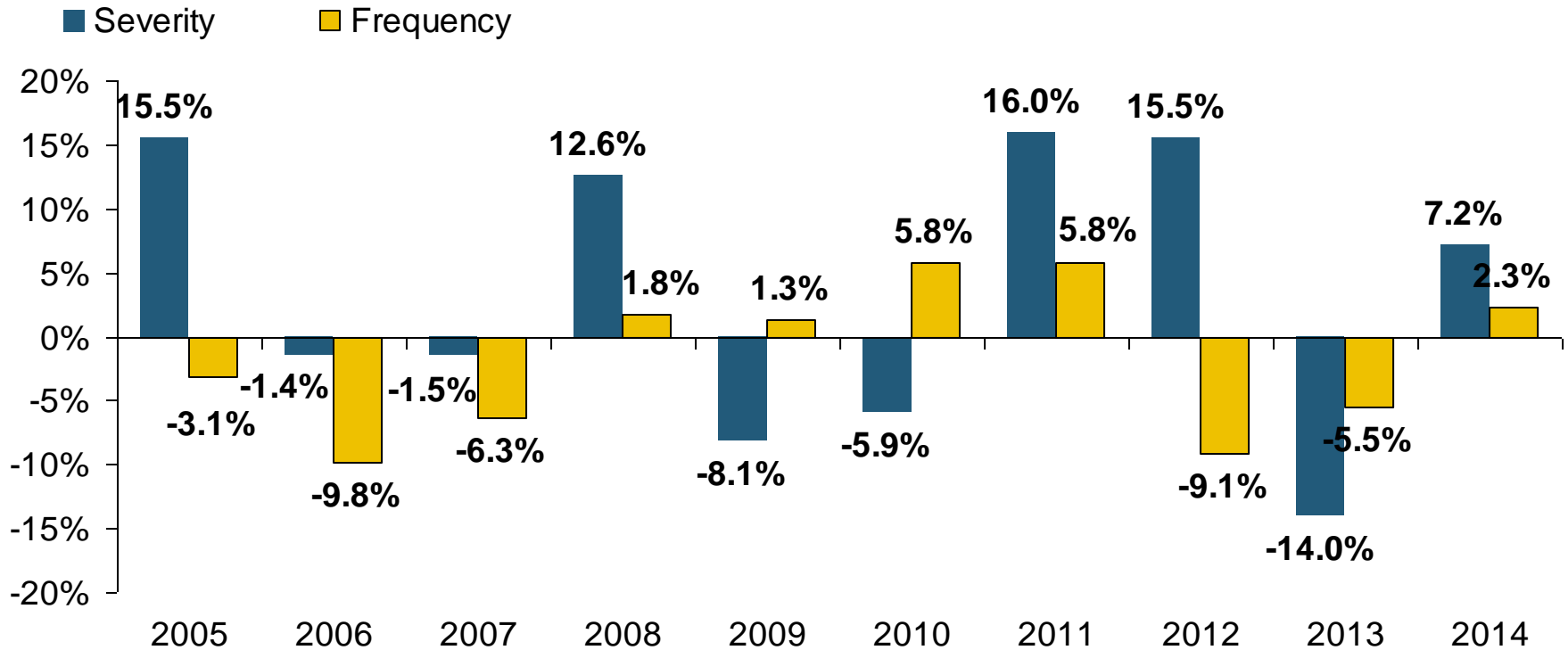


**The Recession, High Fuel Prices Helped Temper Frequency and Severity, But this Trend Will Likely Be Reversed Based on Evidence from Past Recoveries**

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

# Comprehensive Coverage: Severity Trends Are Unfavorable

## Annual Change, 2005 through 2014



**Weather Creates Volatility for Comprehensive Coverage**

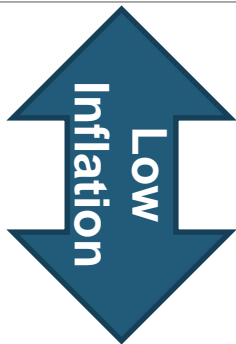
# What About Loss Reserves?

***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								

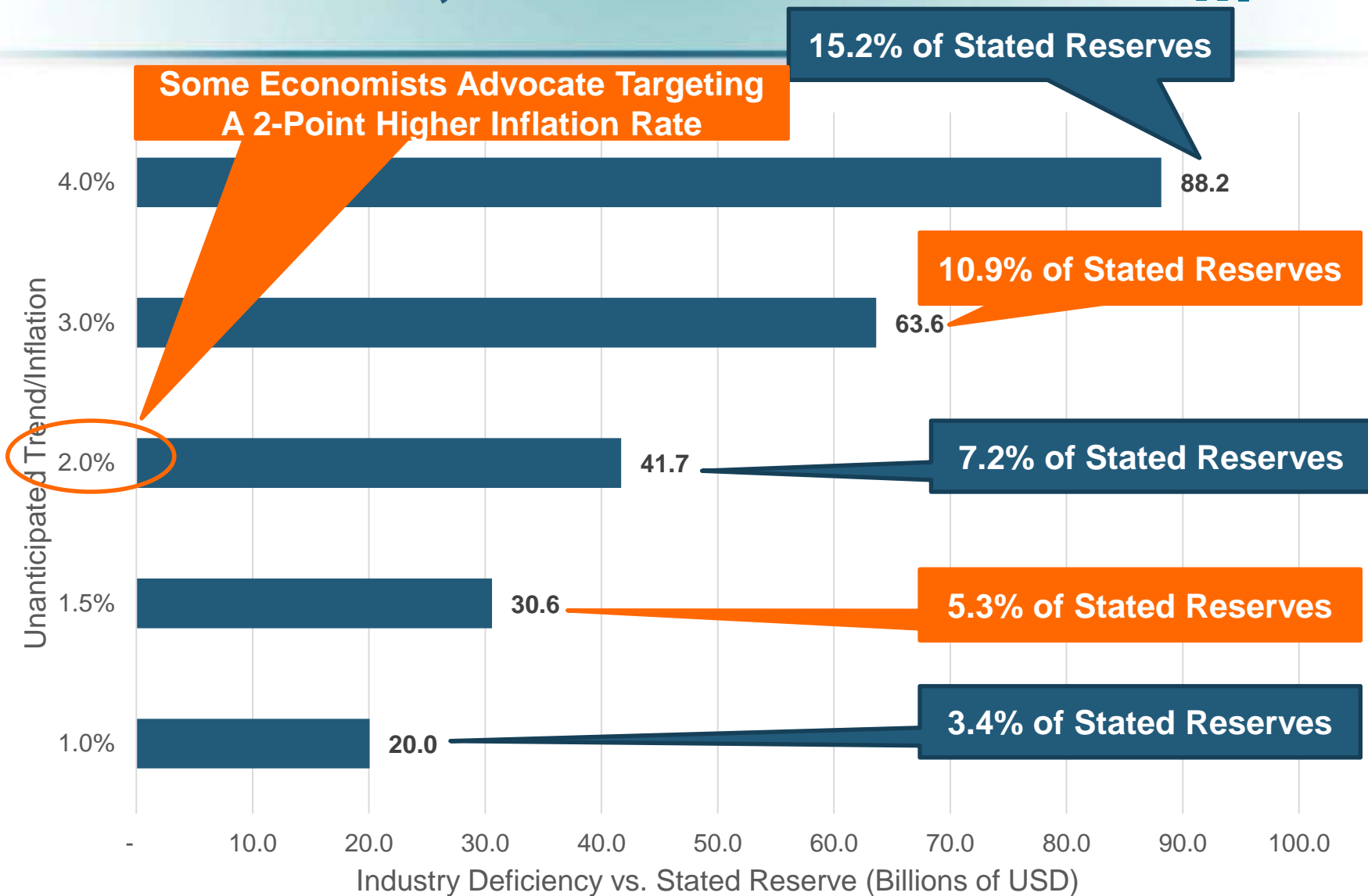


**Note Downward Trend**

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

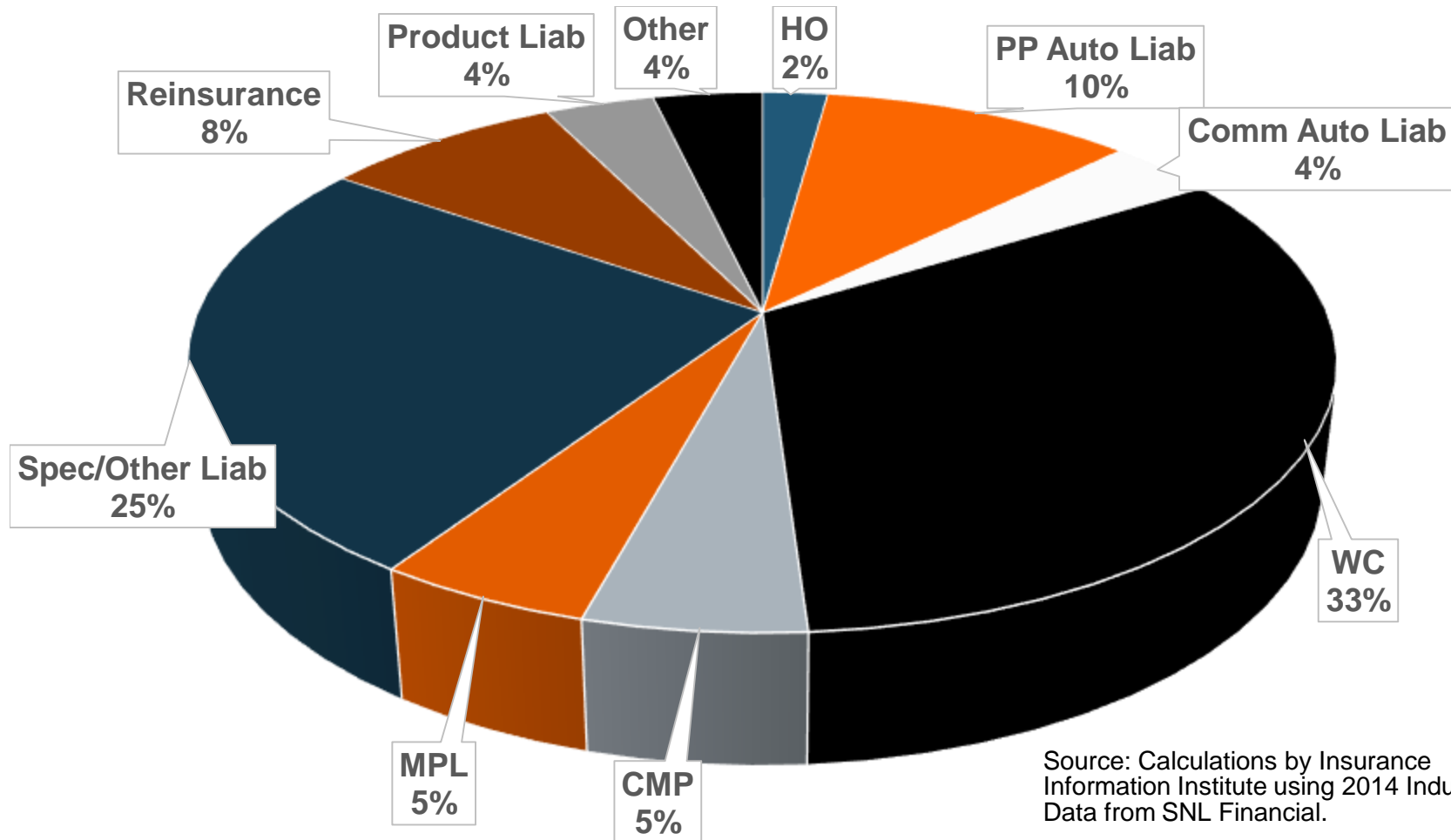
**All Factors Have Low Inflation. Past Three Years Have Low Trend.**

# What If Inflation, Trend Return?



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

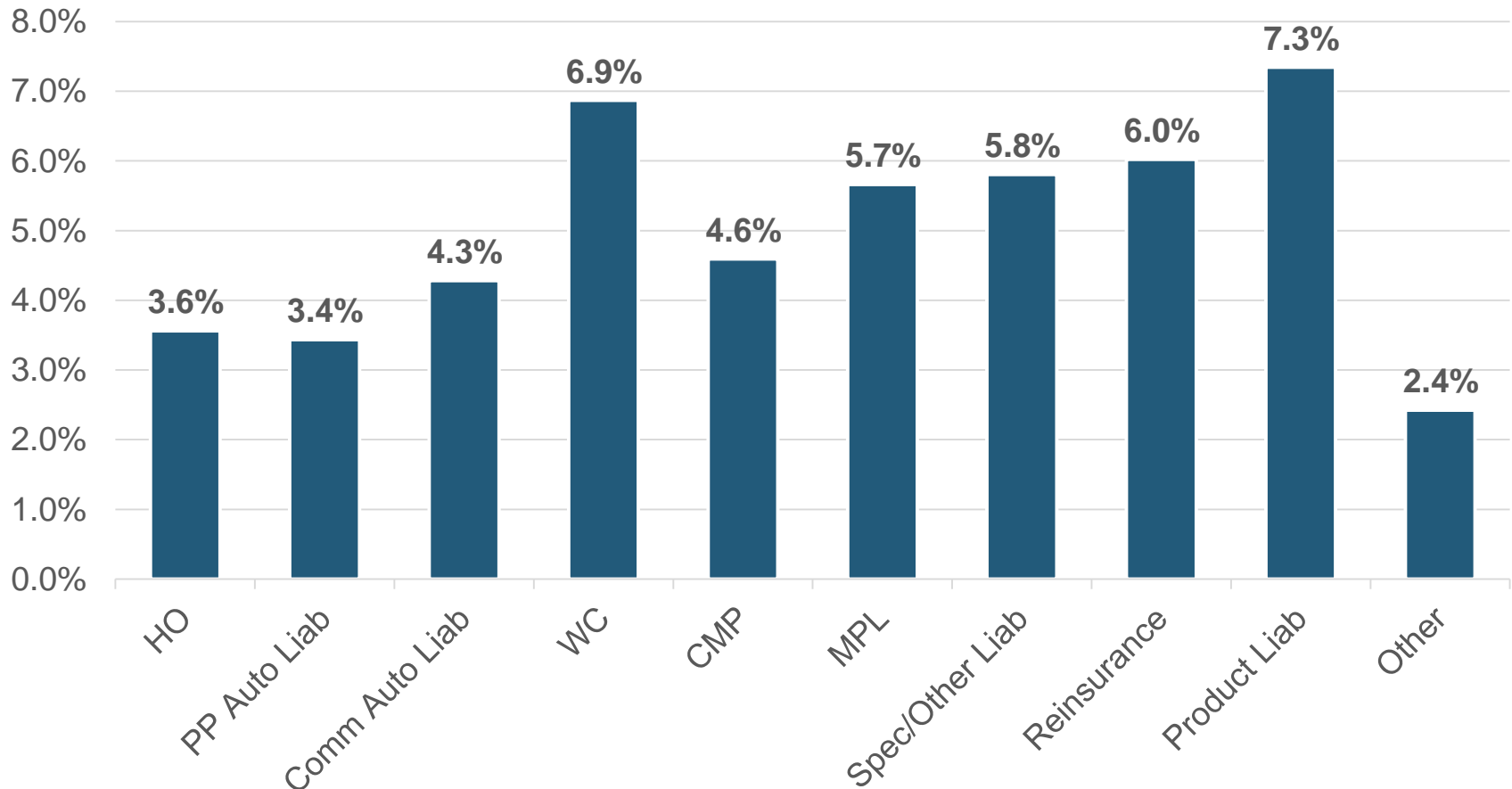
## Distribution of Reserve Increase By Line of Business



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



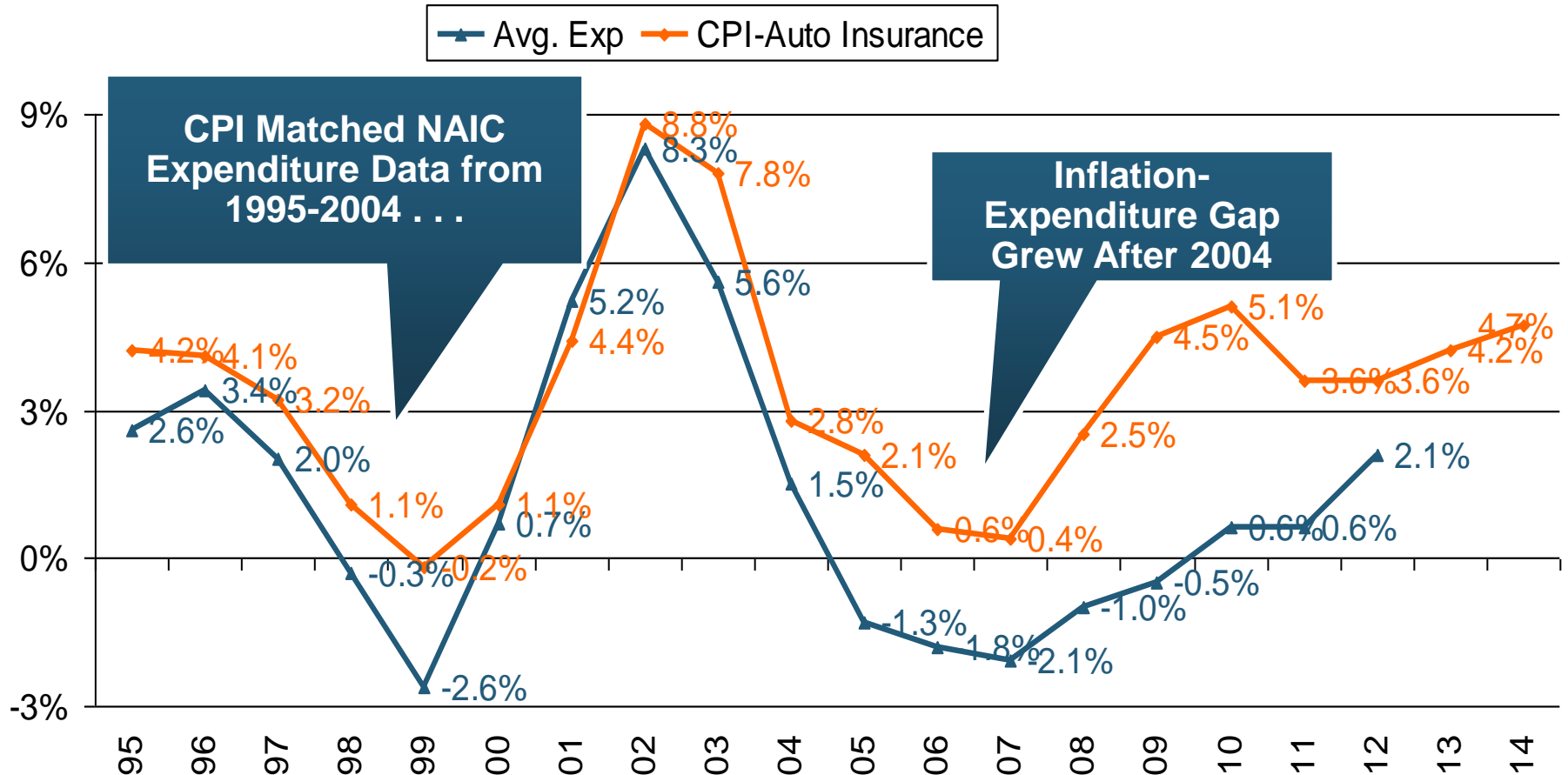
**Some of These Lines Are Already Redundant Industrywide.**

# Inflationary Miscellany

***The Idea:  
We Had A Couple of Interesting  
Slides That Didn't Fit Anywhere  
Else***



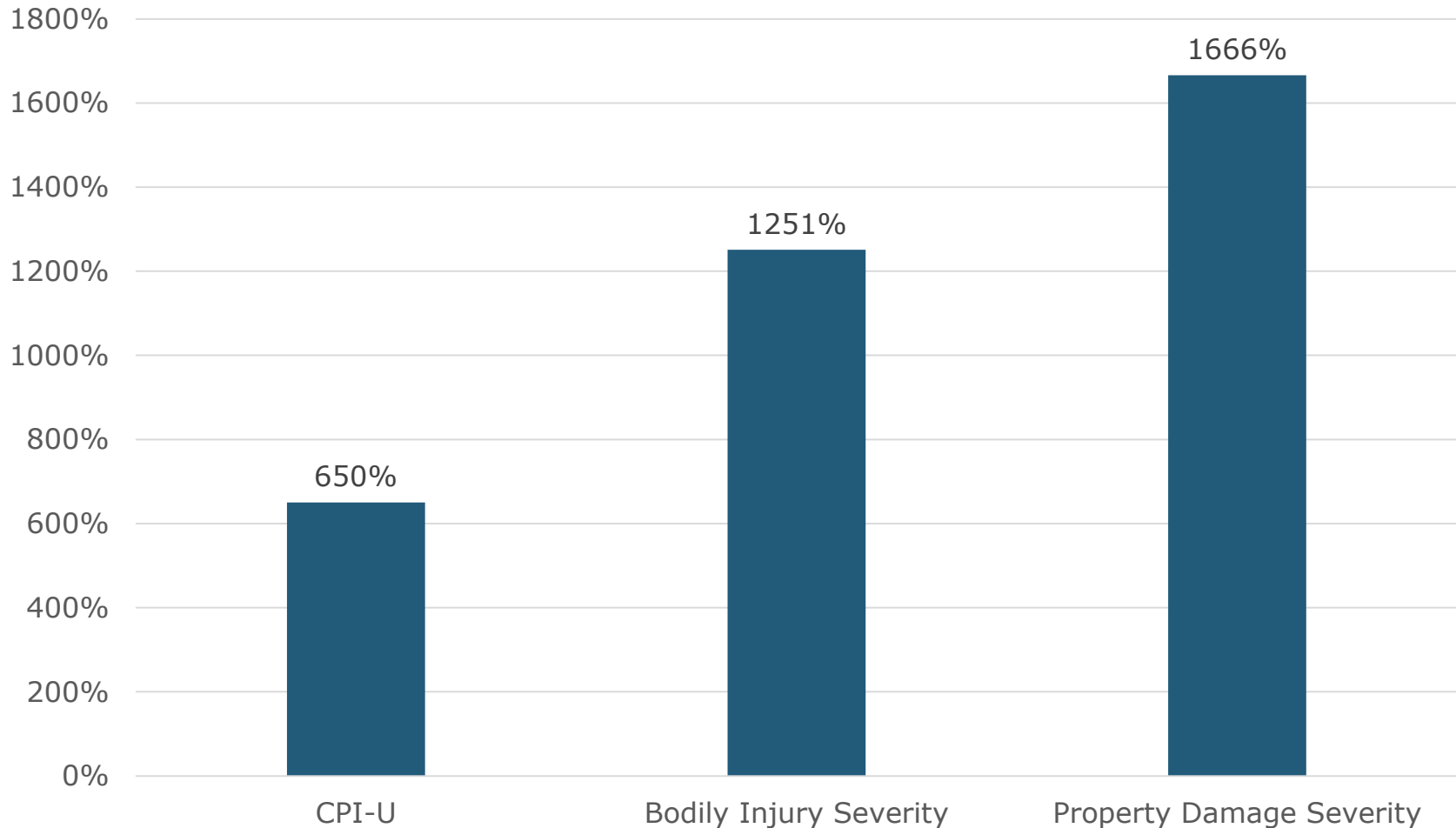
# Auto Insurance Expenditures vs. Insurance Inflation, 1995-2012



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

# Auto Claims Have Grown Faster Than Inflation for 50 Years

## Percentage Change, 1963-2013

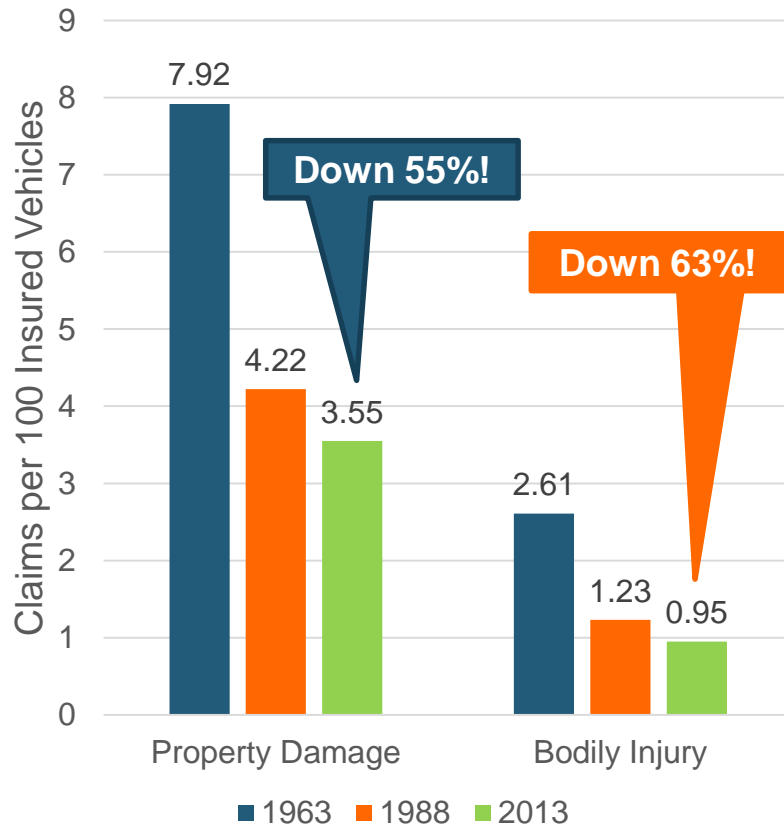


Sources: Insurance Services Office, Bureau of Labor Statistics, calculations by Insurance Information Institute.

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

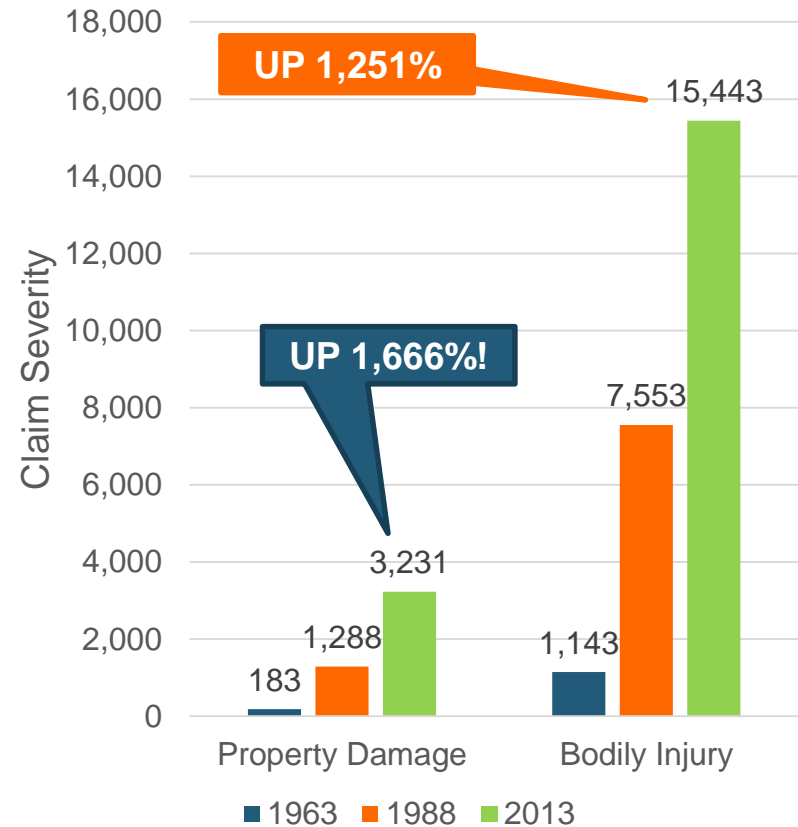
## Safer Cars . . . .

### Frequency



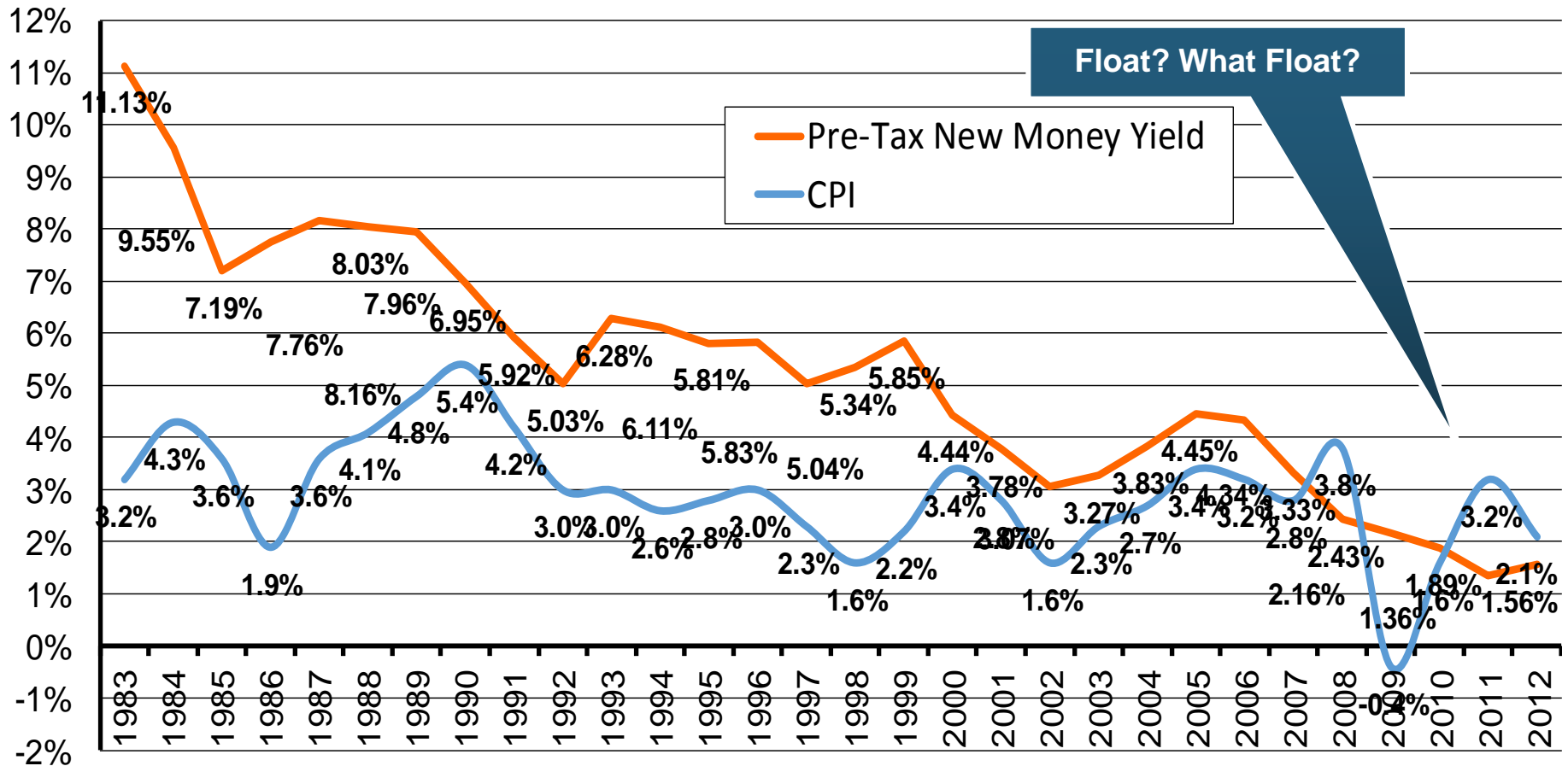
## . . . That Cost More to Repair.

### Severity



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

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

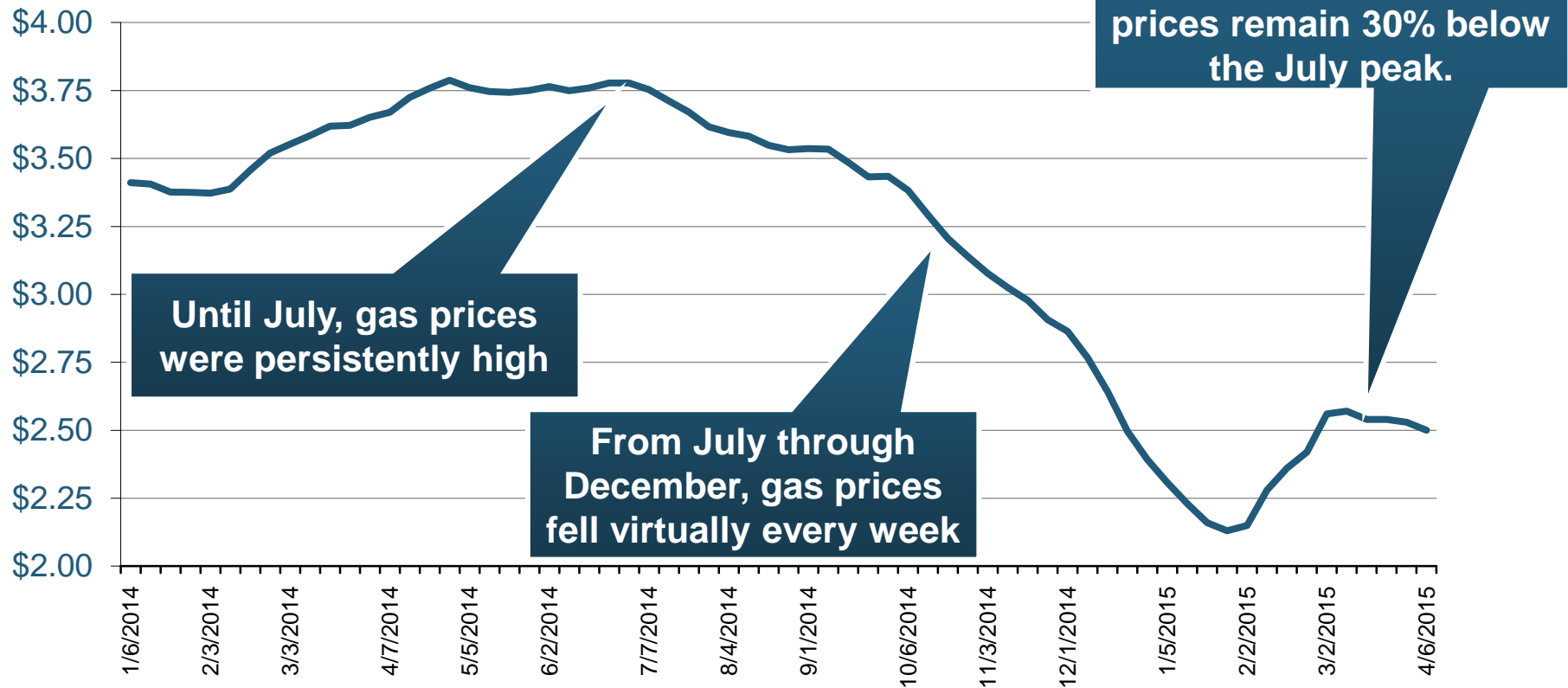


Float? What Float?

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

# The Price of Gas, 2014-2015

## Avg. Price /Gallon

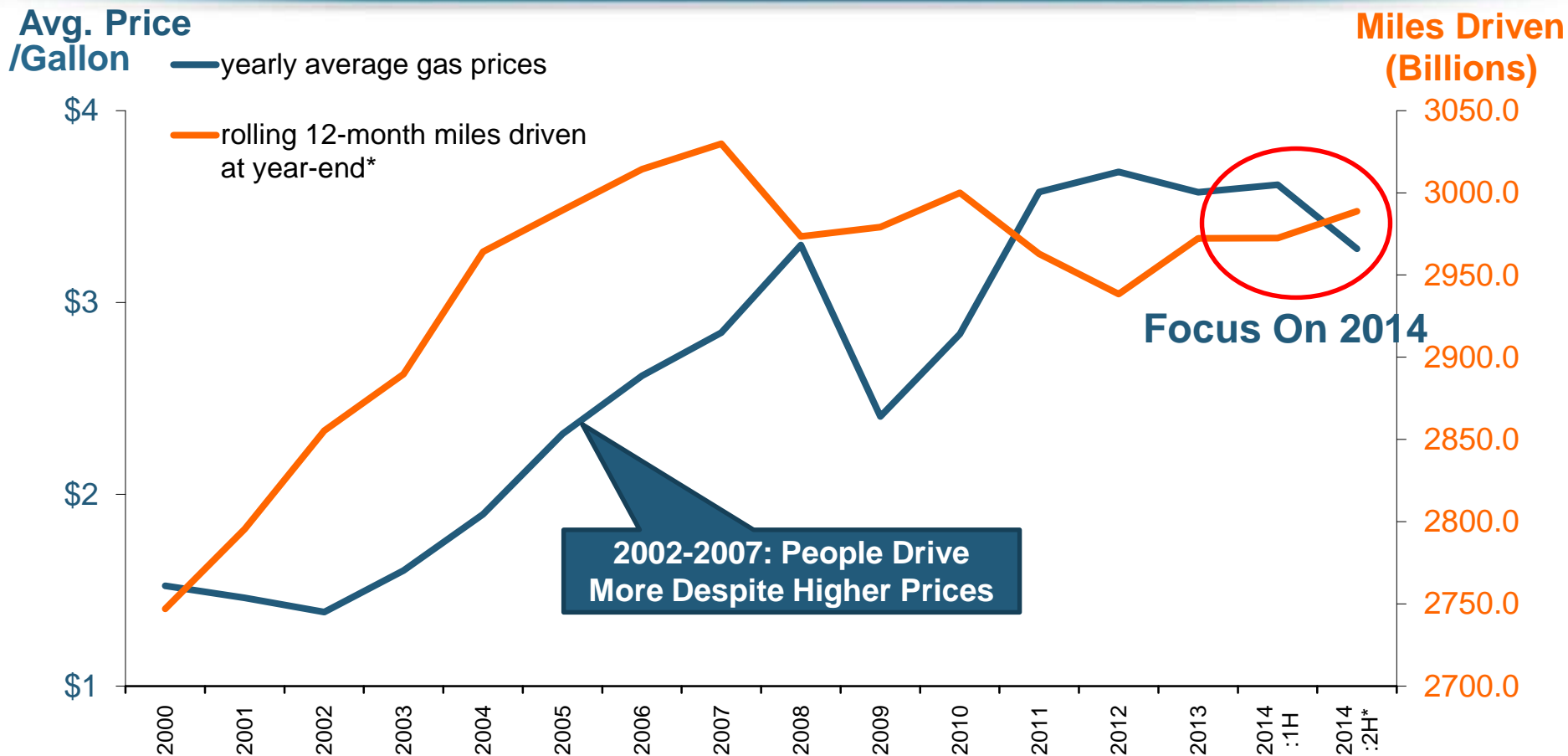


**Over the Course of the Second Half of the 2014 Calendar Year, Gas Prices Fell 34%.**

Price is Weekly U.S. All Grades All Formulations Retail Gasoline Prices

Sources: Federal Energy Administration (<http://www.eia.gov/petroleum/gasdiesel/>); I.I.I.

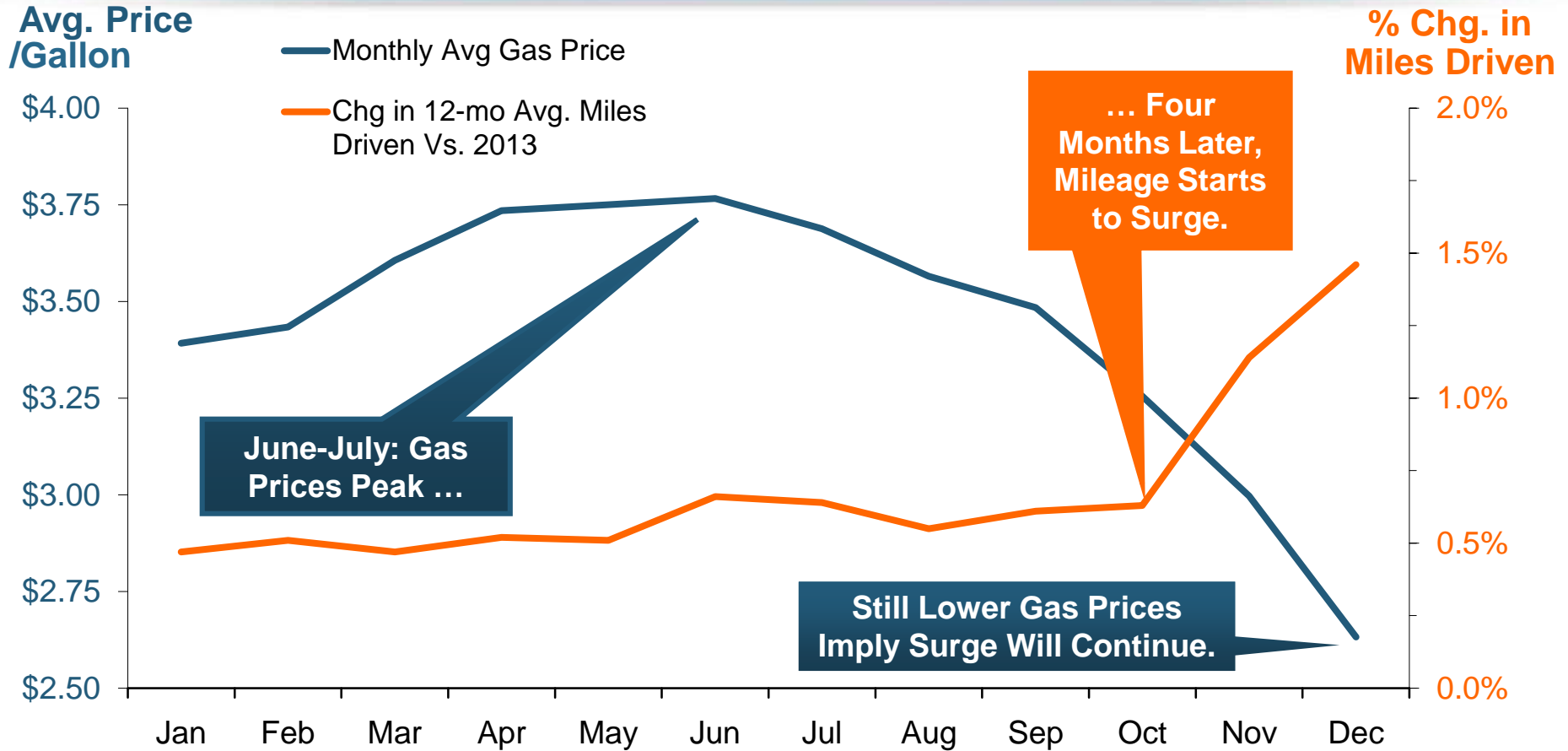
# Do Changes in Gas Prices Affect Miles Driven? 2000-2014



**Lots of Factors Affect Miles Driven: State of Economy, Weather, Gas Prices, Etc.**

Sources: Federal Energy Administration (<http://www.eia.gov/petroleum/gasdiesel/>); \*gas prices and miles driven through December Federal Highway Administration (<http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm>); I.I.I.

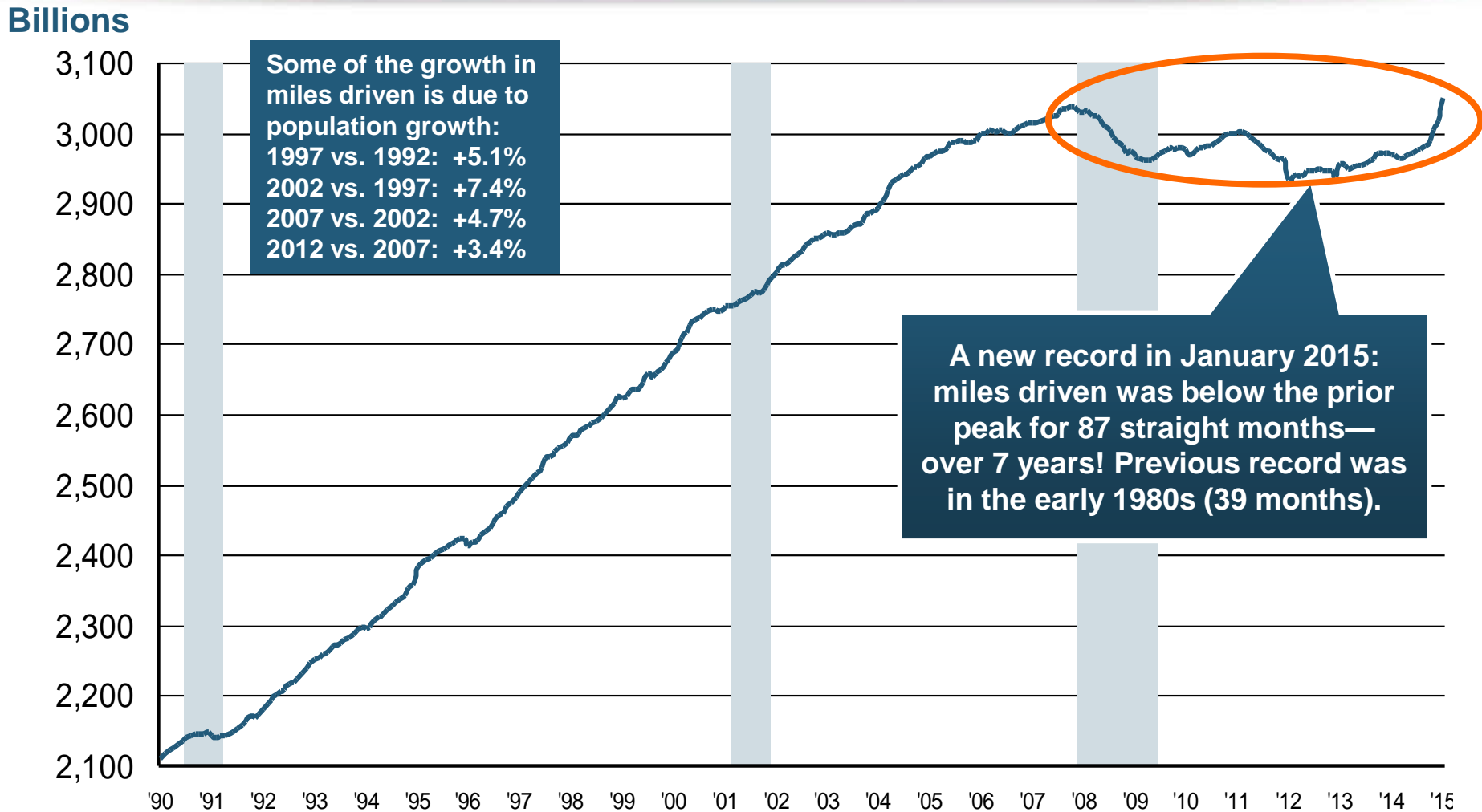
# Do Changes in Gas Prices Affect Miles Driven? A Look at 2014



**Prior research on the relationship between gas prices and miles driven says that, in the short run, an increase in gas prices produces little change in miles driven. No recent research on the effect of price drops.**

Sources: Federal Energy Administration (<http://www.eia.gov/petroleum/gasdiesel/>); \*gas prices and miles driven through December  
 Federal Highway Administration (<http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm>); I.I.I.

# Something Unusual is Happening: Miles Driven\*, 1990–2015



\*Moving 12-month total. The 2015 figure is through January 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.



Insurance Information Institute Online:

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

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and your attention!*

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