



# Risk in Forecasting

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**How does risk impact a forecast?**

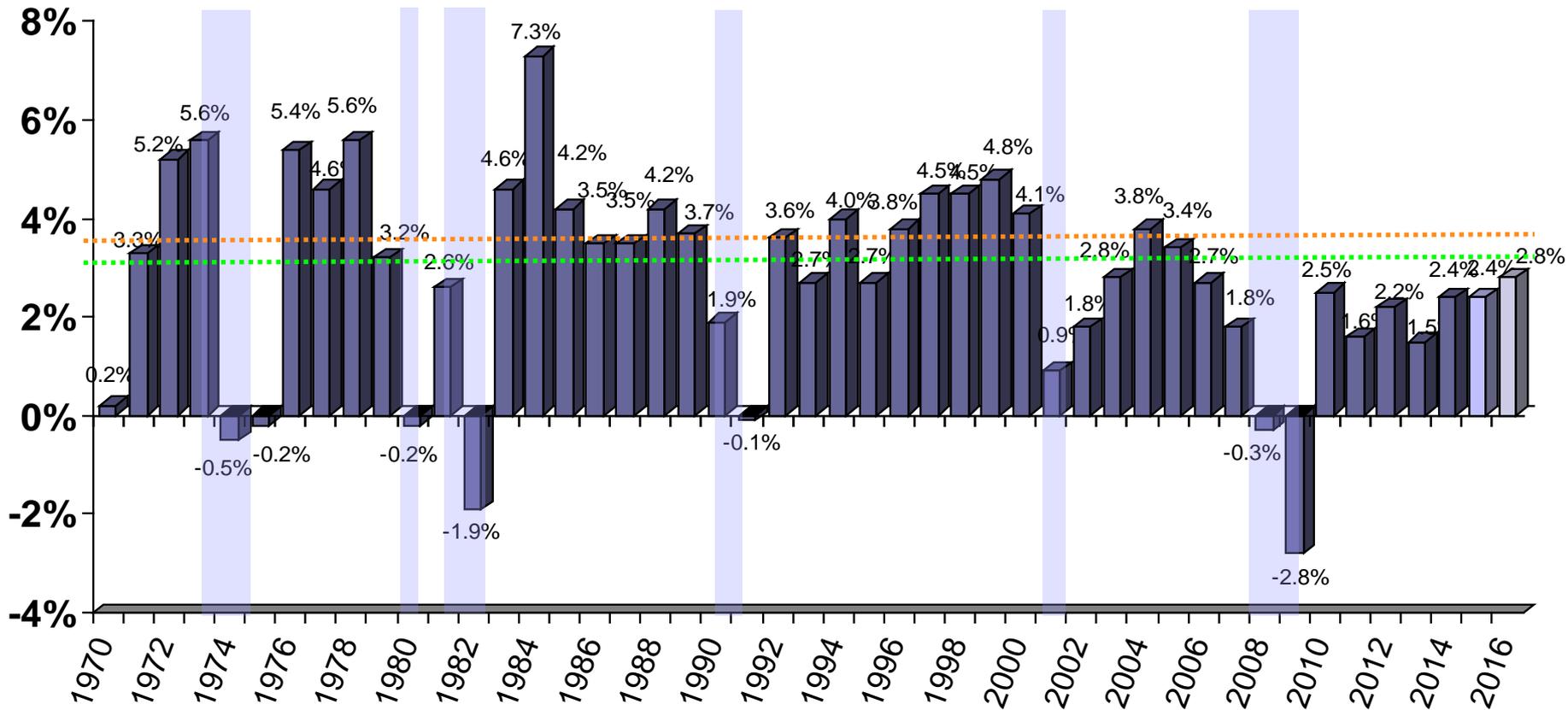
**How should it be handled in budget development?**

**What are the risks?**



# United States Real Gross Domestic Product\* Annual Growth 1970 - 2016\*\*

Source: U.S. Bureau of Economic Analysis & *Blue Chip Economic Indicators*



\* Based on chained 2009 dollars.

\*\* 2015 and 2016 are a forecast from the Blue Chip Economic Indicators, July 2015.

----- 3.6% = 40-year avg during expansion

----- 3.1% = 20-year avg during expansion

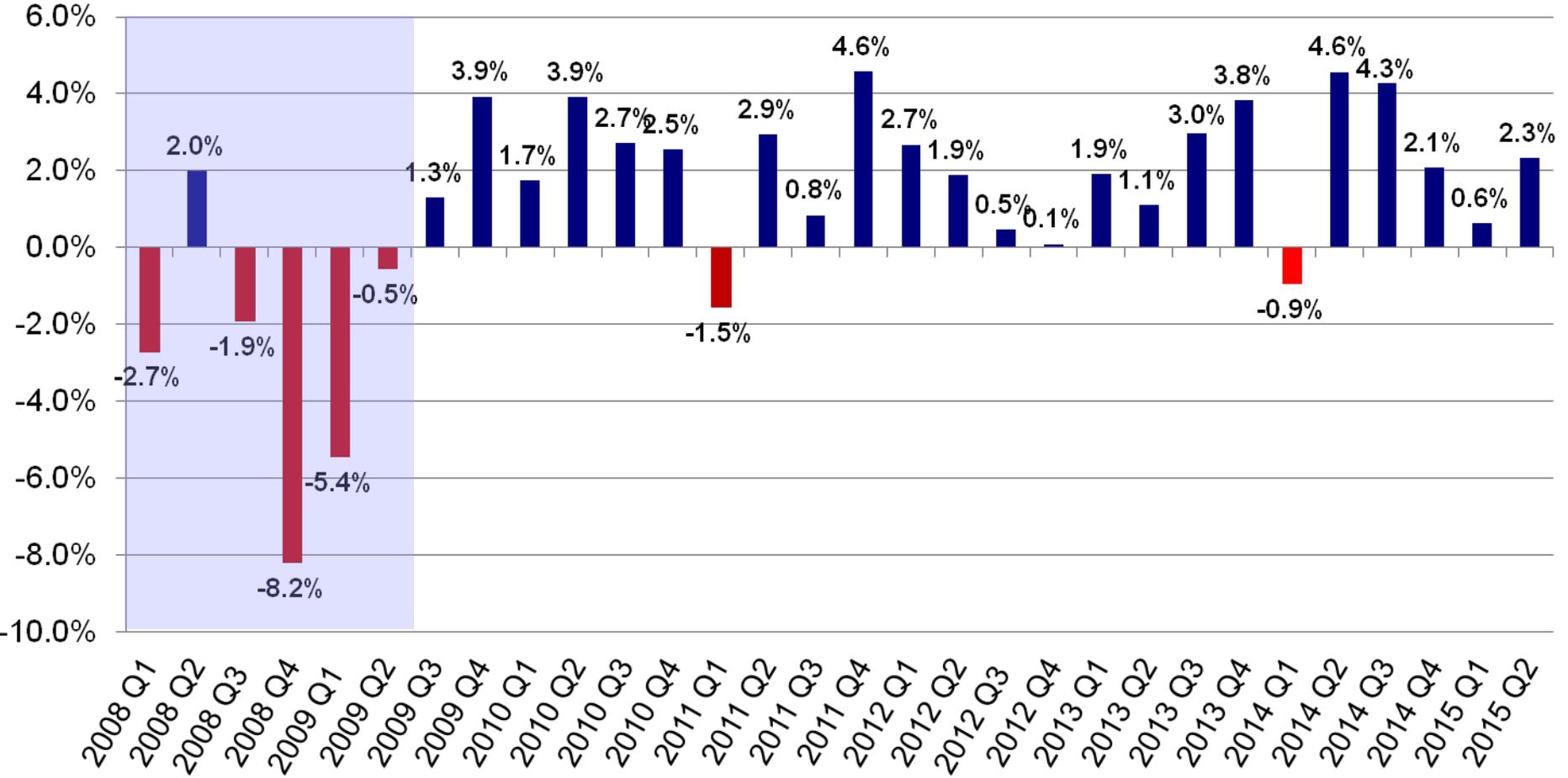
Recession Periods



# United States Real Gross Domestic Product\*

## Quarterly Growth 2008 – 2015\*\*

Source: U.S. Bureau of Economic Analysis



\* Based on chained 2009 dollars.

\*\* Data through Q2 2015.

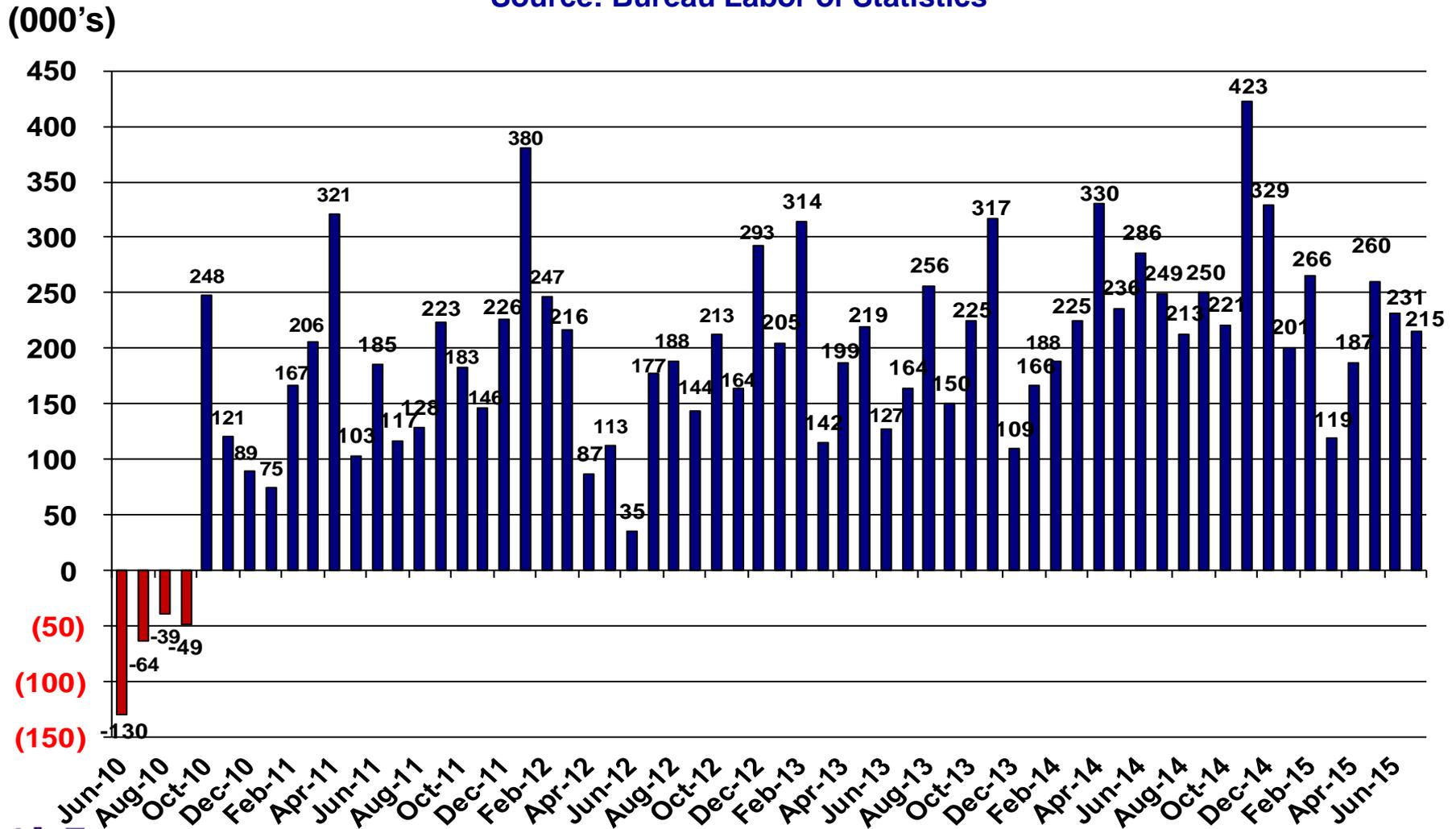
 Recession Periods



# U.S. Non-Farm Employment Change from Prior Month (S/A)

## June 2010 – July 2015

Source: Bureau Labor of Statistics

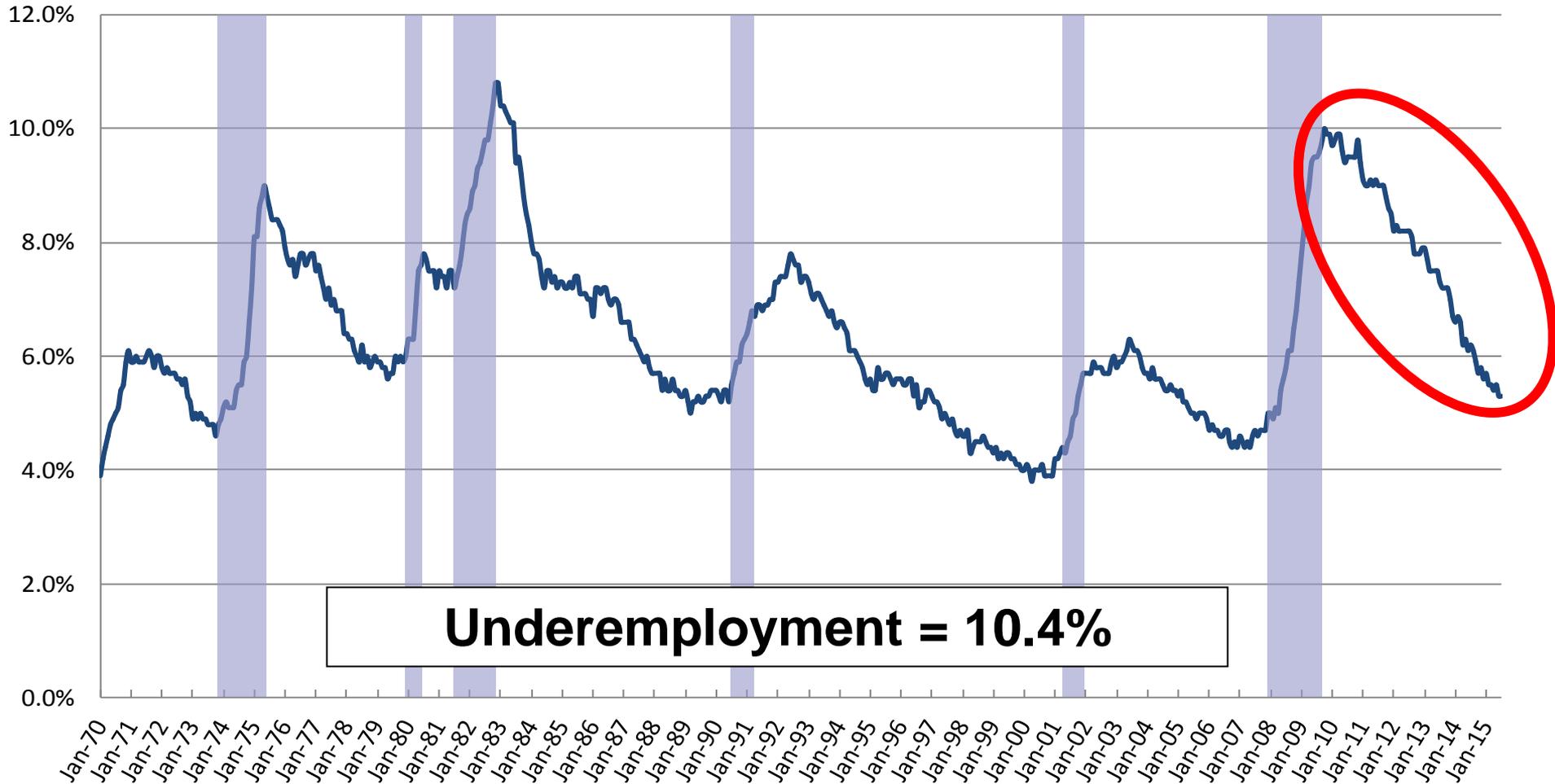


# U.S. Unemployment Rate

1970 – 2015\*

Source: Bureau of Labor Statistics

Recession Periods



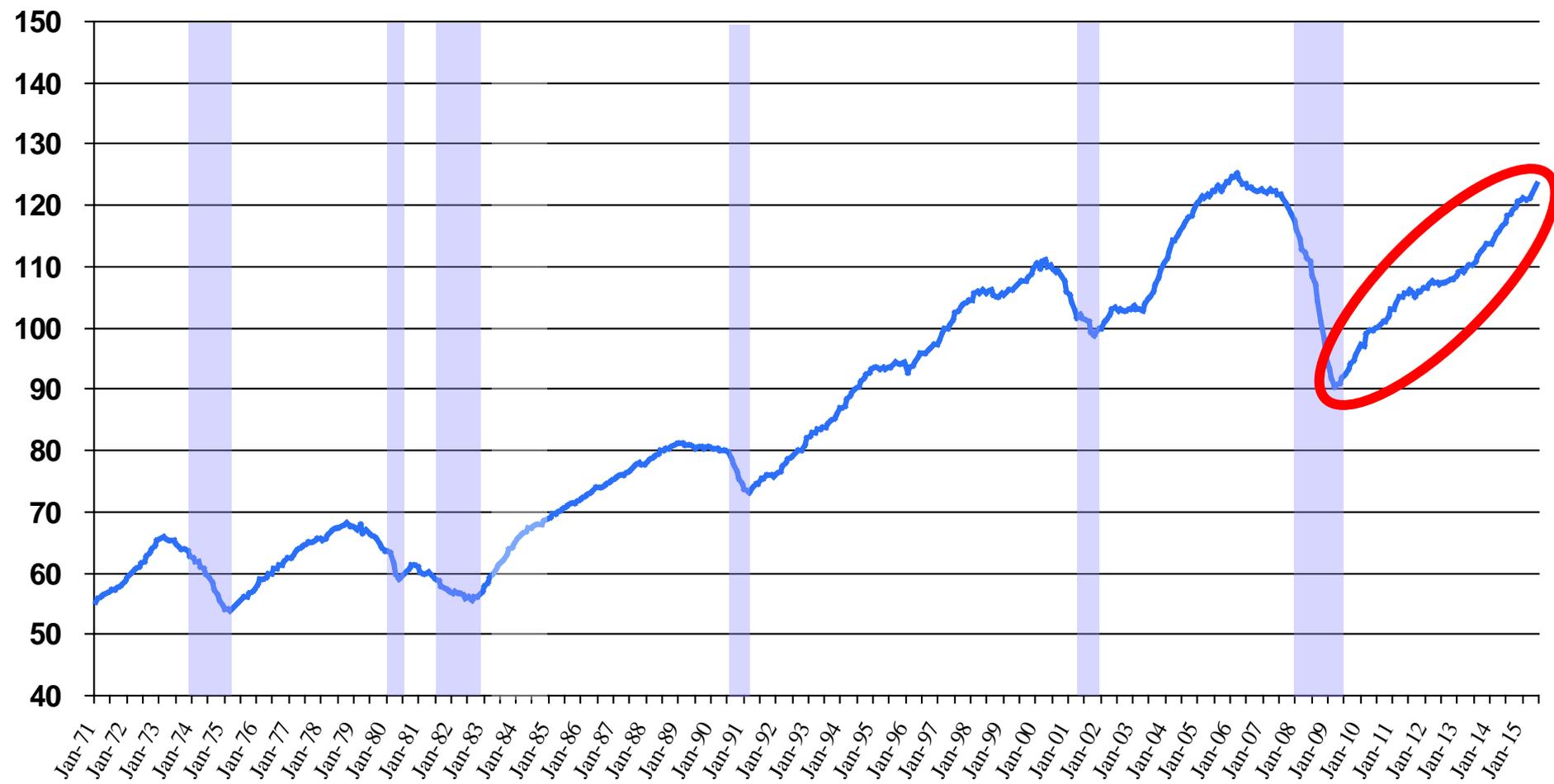
**Underemployment = 10.4%**



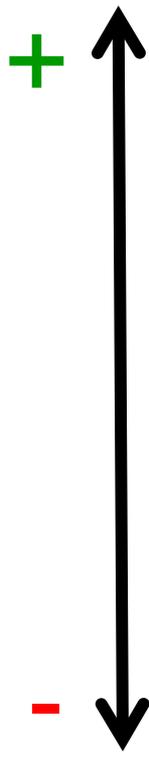
# U.S. Leading Indicators 1971 – 2015\*

Source: The Conference Board

Recession Periods



# 10 Components of U.S. Leading Indicators – June 2015

- 
- Interest rate spread
  - Building Permits
  - Consumer expectations
  - Leading credit index (inverted)
  - Manuf. new orders – capital goods
  - Manuf. new order index
  - Manuf. new orders – consumer goods
  - Claims for unemployment (inverted)
  - Manuf. Hours
  - **Stock Prices**

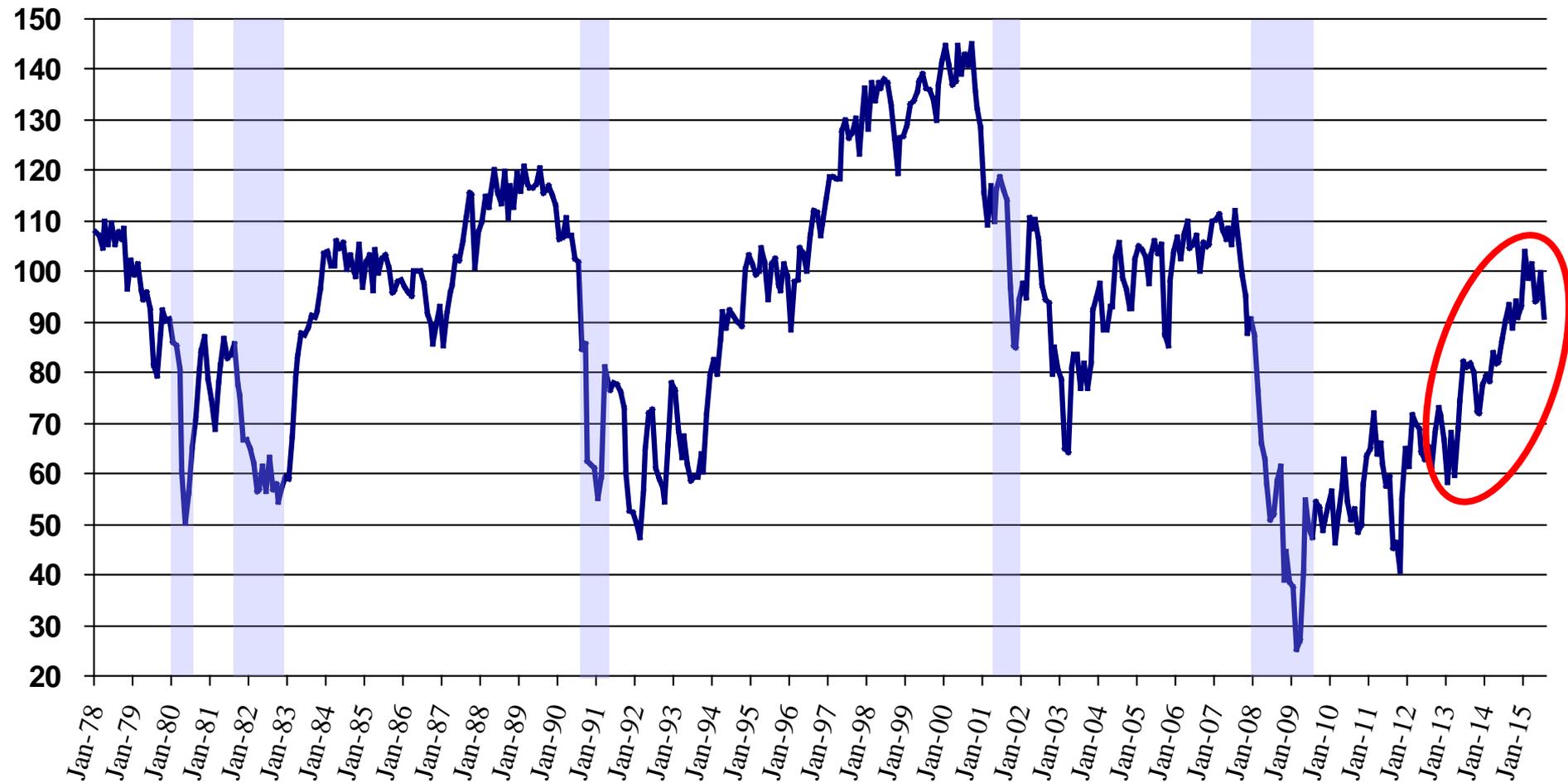


# Consumer Confidence

## 1978 – 2015\*

Source: The Conference Board

Recession Periods



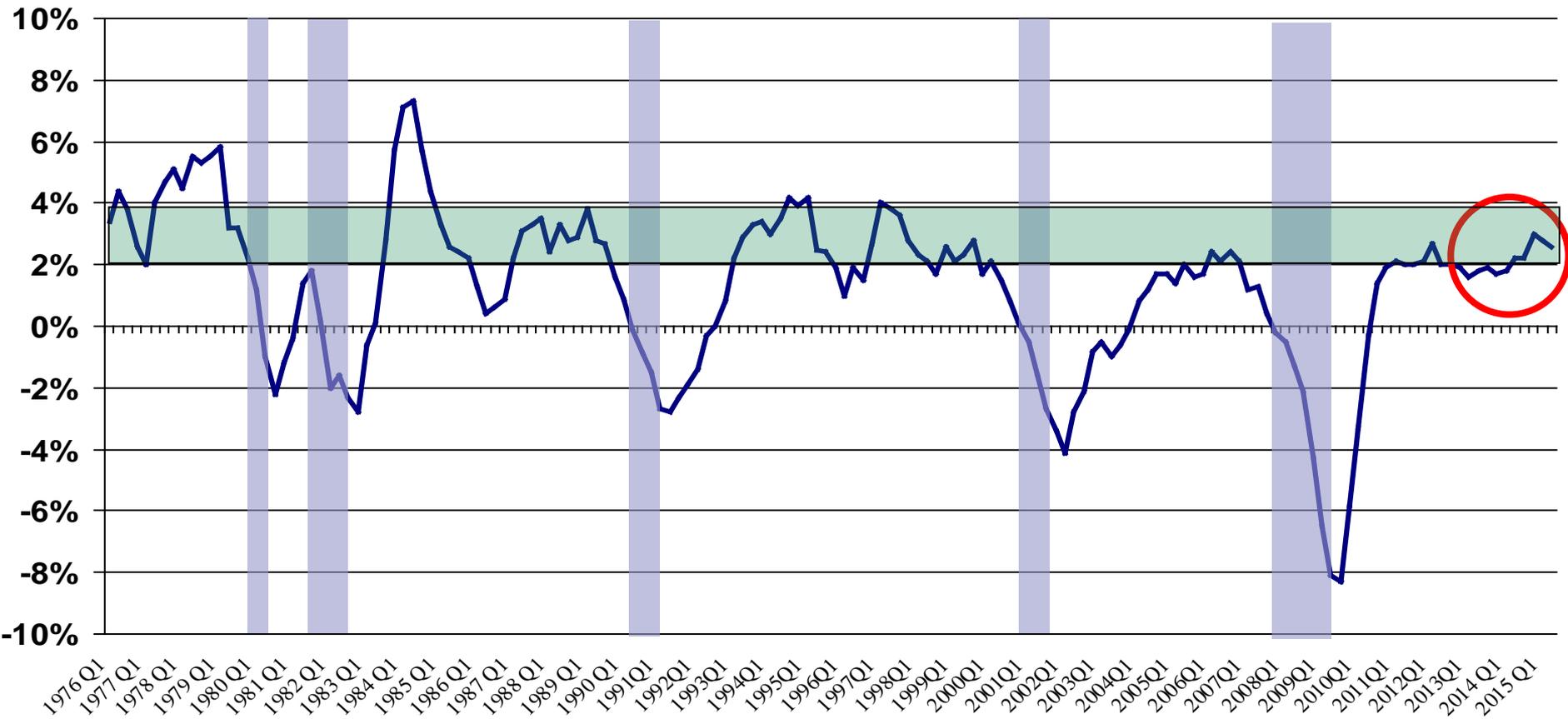
\*Data through July 2015.



# Hours Worked Percent Change from Year Ago 1976 – 2015\*

Source: Bureau of Labor Statistics

Recession Periods

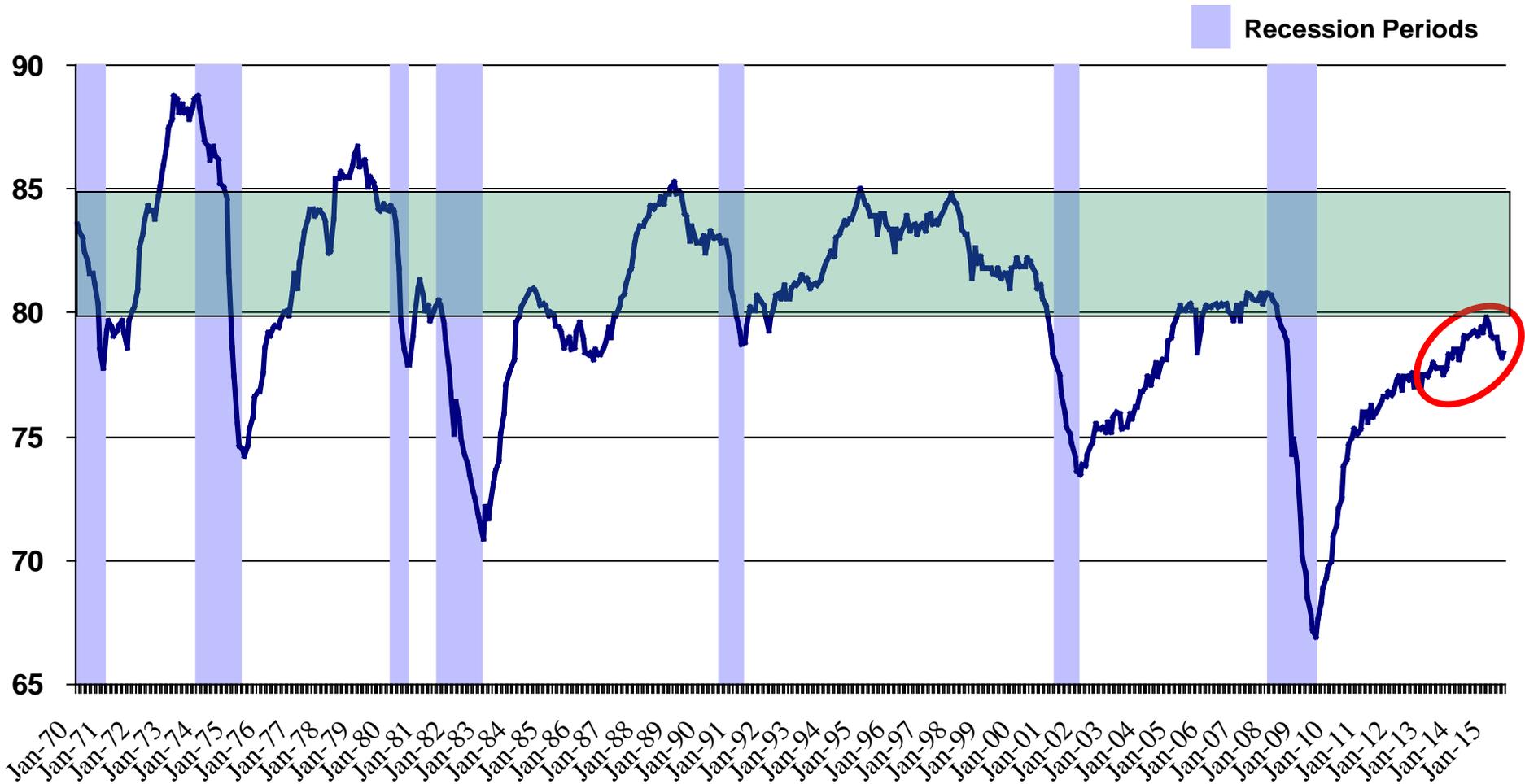


\*Data through second quarter 2015



# Capacity Utilization Rate 1970 – 2015\*

Source: The Federal Reserve Bank of St. Louis





**All about jobs and population  
growth.**

**Don't get caught up in the  
negative discussion.**

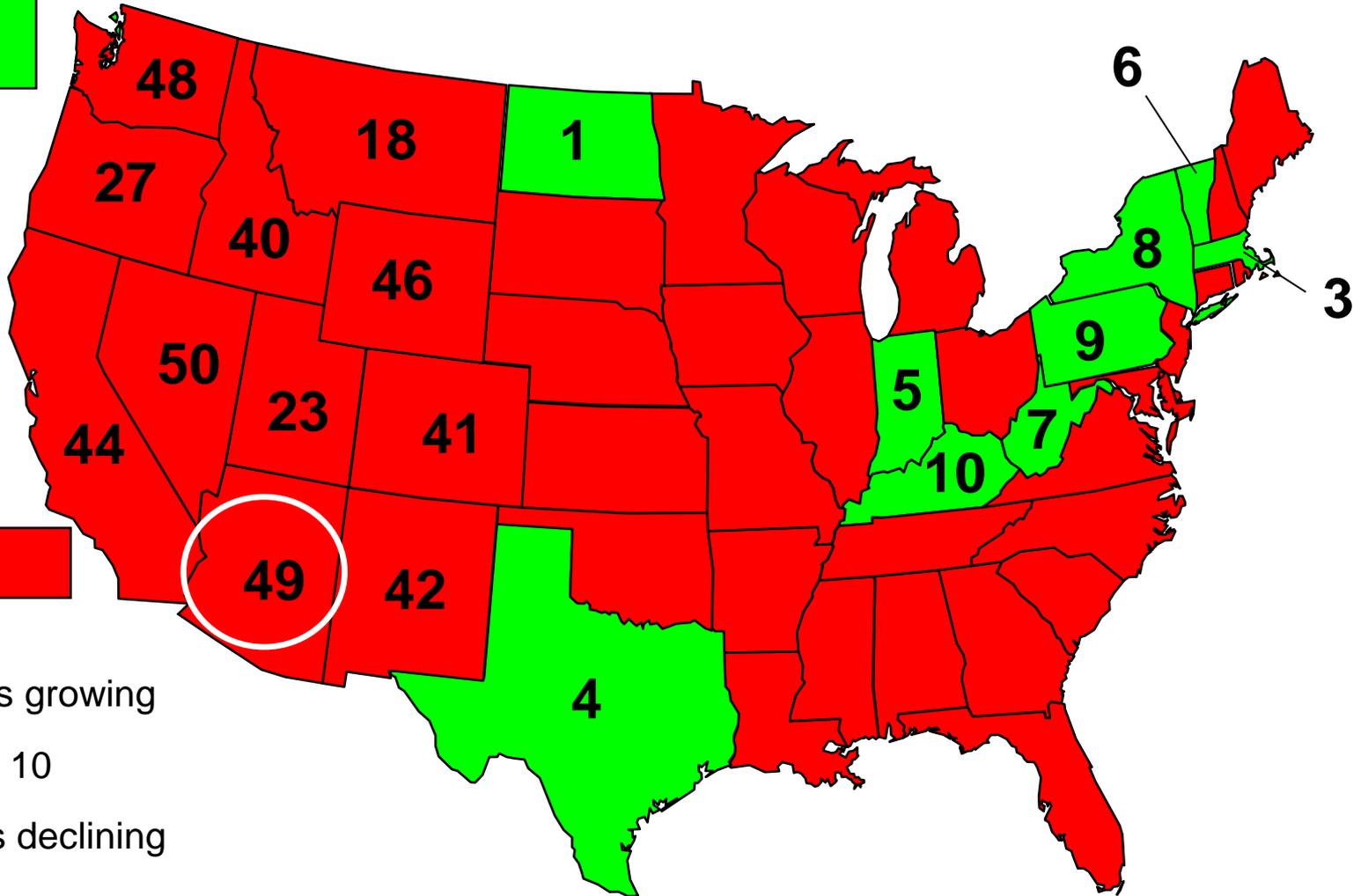


# Job Growth 2010

Source: US BLS

Alaska

2



32

Hawaii

-  Jobs growing
-  Top 10
-  Jobs declining

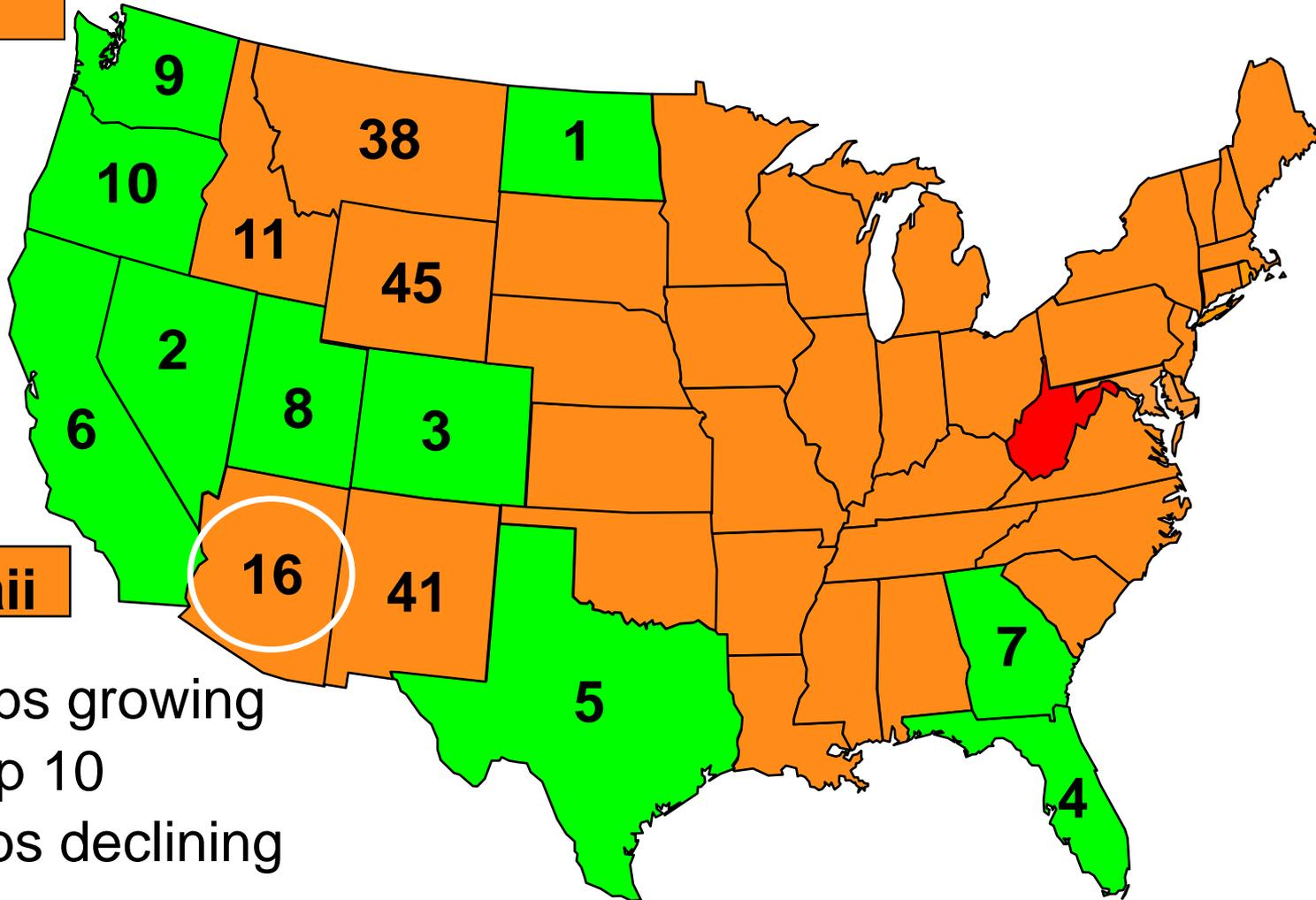


# Job Growth 2014

Source: US BLS

**Alaska**  
49

**Hawaii**  
34



- Jobs growing
- Top 10
- Jobs declining

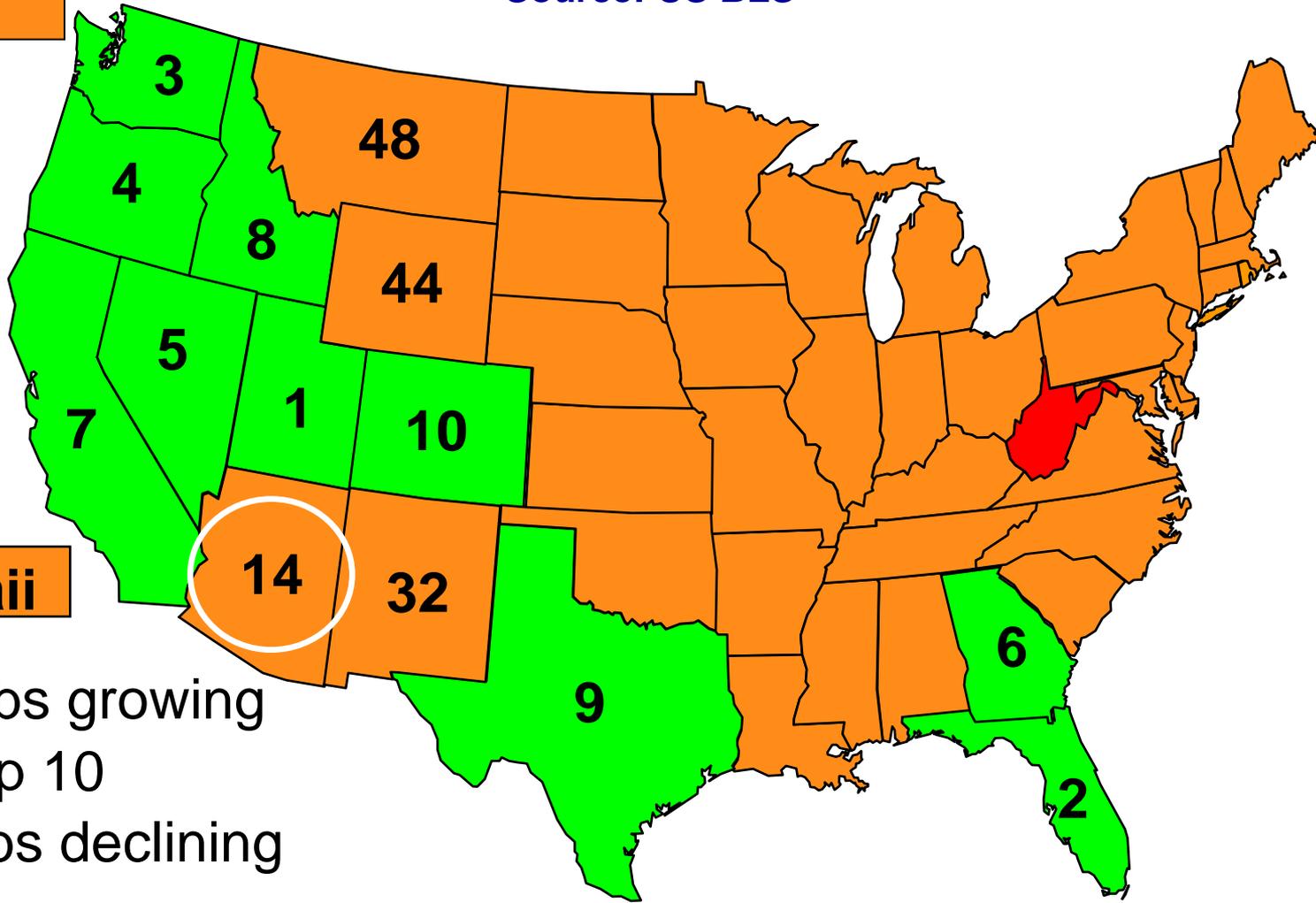


# Job Growth 2015

YTD June 2015 vs YTD June 2014

Source: US BLS

**Alaska**  
47



38  
**Hawaii**

- Jobs growing
- Top 10
- Jobs declining

# Arizona Employment Growth

## Arizona's Rank Out of 50 States

Source: Arizona State University, U.S. Bureau of Labor Statistics

Year	Rank
1992	23
1993	5
1994	2
1995	2
1996	2
1997	2
1998	1
1999	2
2000	5
2001	9
2002	10
2003	4

Year	Rank
2004	2
2005	2
2006	2
2007	17
2008	46
2009	49
2010	49
2011	27
2012	9
2013	10
2014	16
2015*	14



# Phoenix-Mesa-Scottsdale Employment Growth

(Ranking among all metro areas greater than 1,000,000)

Source: Arizona State University, U.S. Bureau of Labor Statistics

Year	Rank	# MSA's
1992	4	19
1993	2	19
1994	1	19
1995	1	20
1996	1	21
1997	2	22
1998	1	23
1999	3	24
2000	7	25
2001	7	26
2002	5	25
2003	3	25

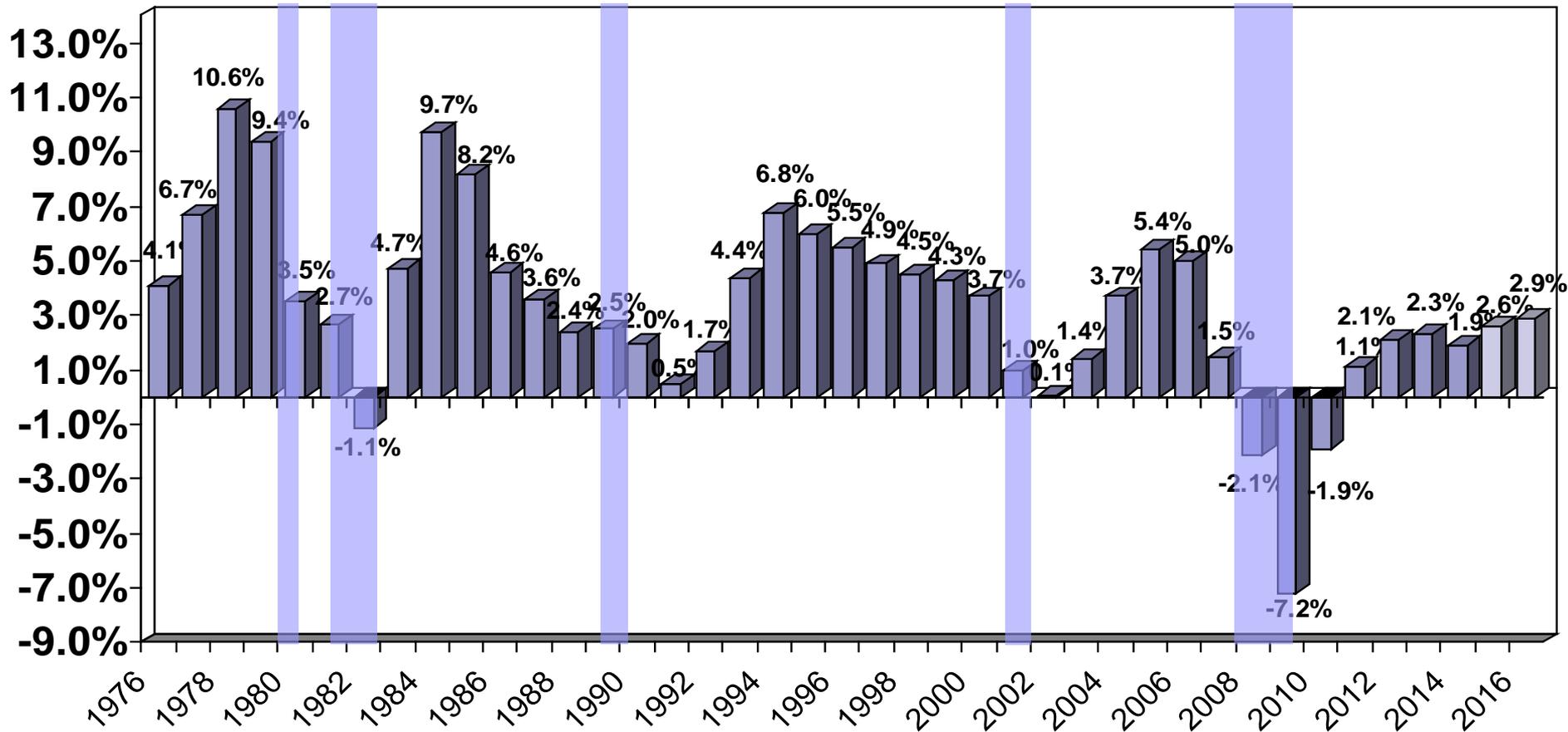
Year	Rank	# MSA's
2004	3	25
2005	1	26
2006	1	27
2007	10	29
2008	25	29
2009	23	24
2010	23	23
2011	14	25
2012	11	28
2013	9	28
2014	16	31
2015*	13	32



# Arizona Employment\*

## Annual Percent Change 1976–2016\*\*

Source: Arizona Department of Administration



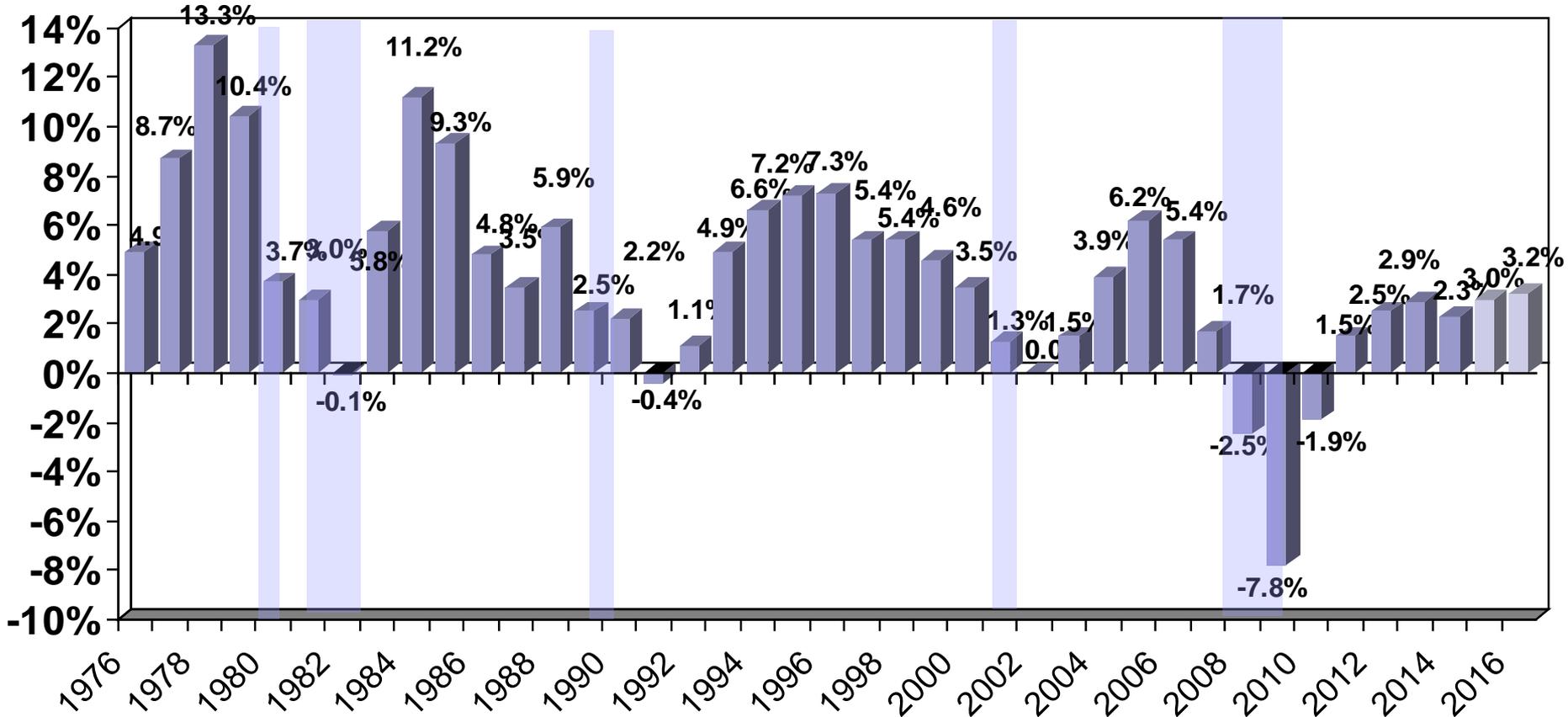
Recession Periods

\*Non-agricultural wage & salary employment. Changed from SIC to NAICS reporting in 1990.

\*\*2015 & 2016 forecasts from Elliott D. Pollack & Co. as of July 2015.

# Greater Phoenix Employment\* Annual Percent Change 1976–2016\*\*

Source: Arizona Department of Administration



Recession Periods

\*Non-agricultural wage & salary employment. Changed from SIC to NAICS reporting in 1990.

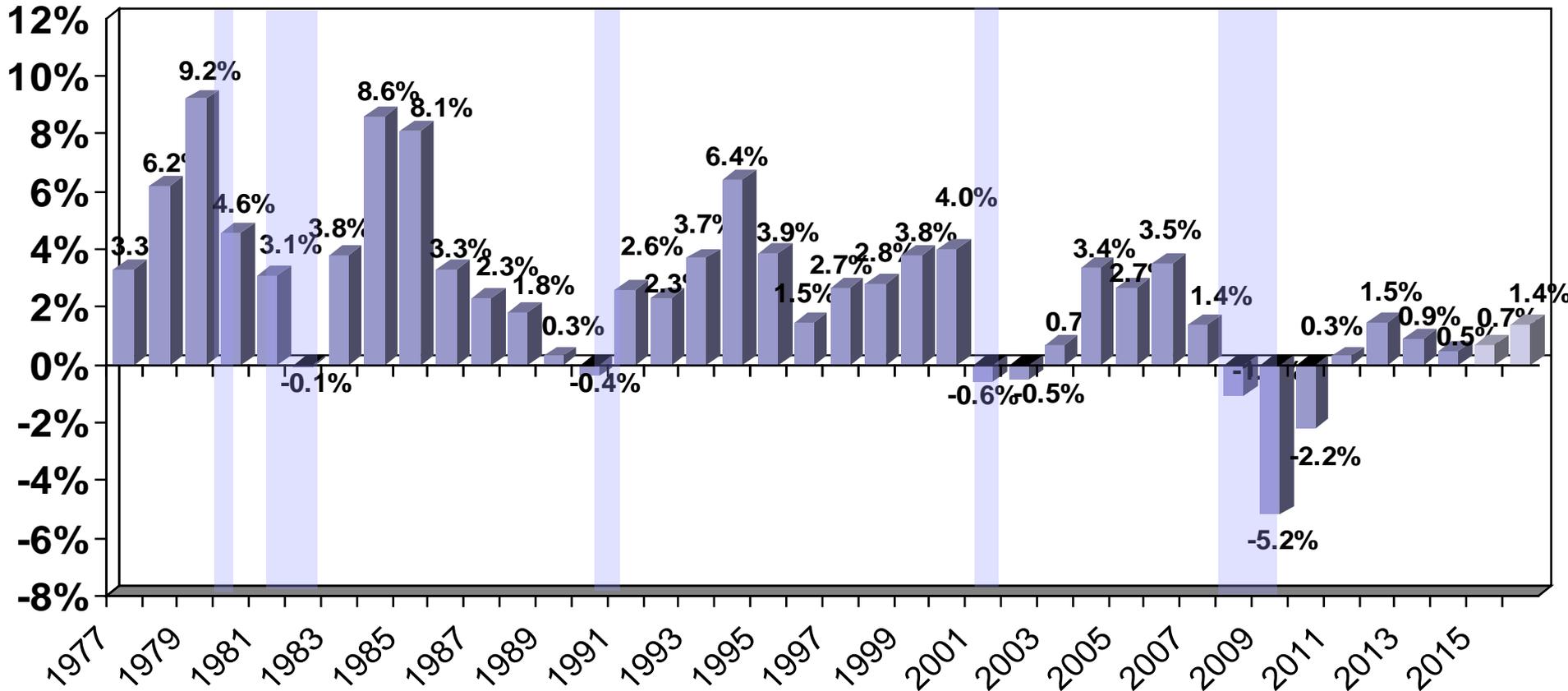
\*\*2015 & 2016 forecasts from Elliott D. Pollack & Co. as of July 2015.



# Greater Tucson Employment\*

## Annual Percent Change 1977–2016\*\*

Source: Arizona Department of Administration



Recession Periods

\*Non-agricultural wage & salary employment. Changed from SIC to NAICS reporting in 1990.

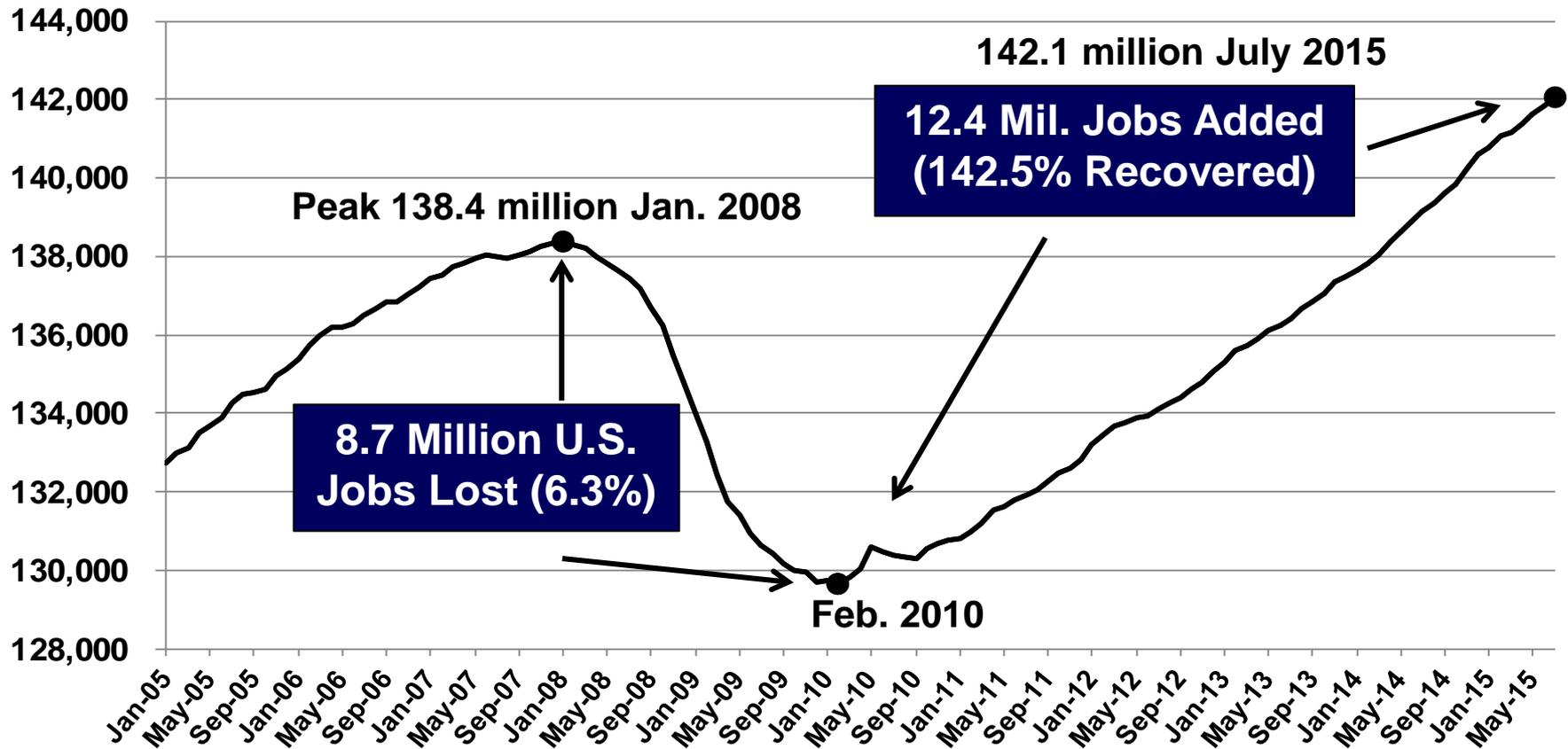
\*\*2015 & 2016 forecasts from the University of Arizona as of the third quarter 2015.



# U.S. Seasonally Adjusted Non-Farm Employment 2005 – 2015\*

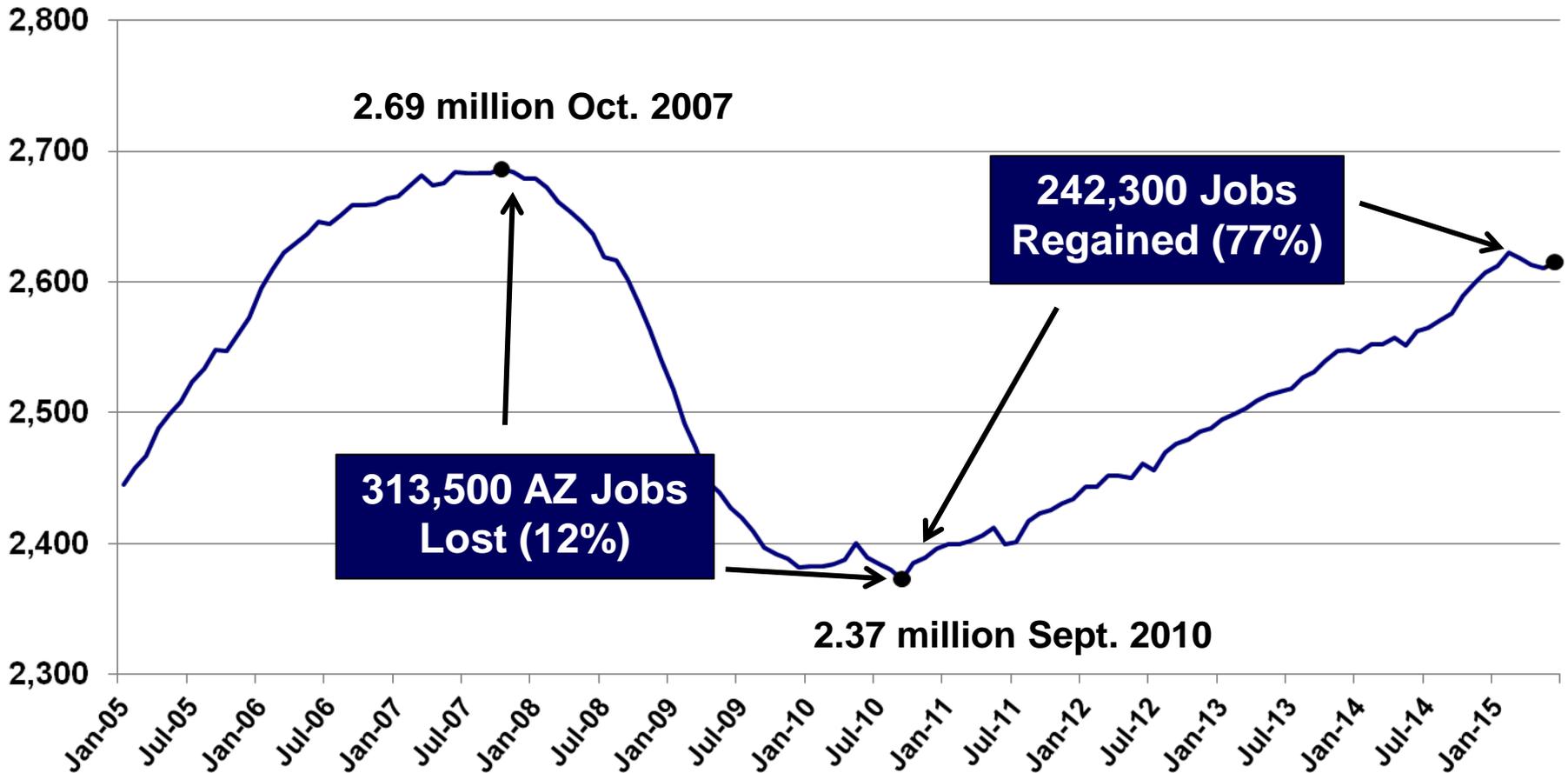
Source: Bureau of Labor Statistics

(000's)



# AZ Has Regained 77% of Lost Jobs

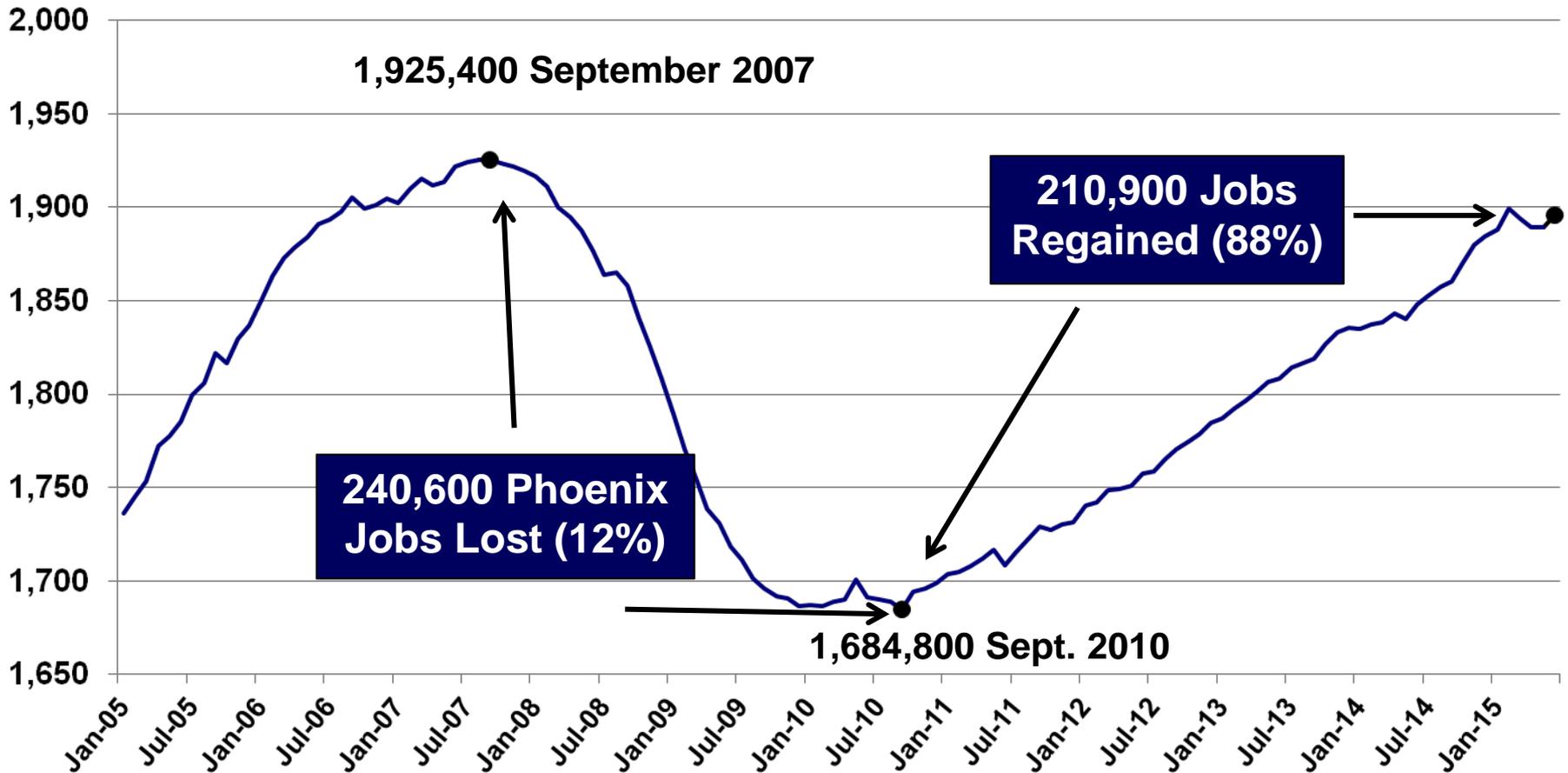
## 71,200 Jobs (23%) Still to Recover



Source: U.S. Bureau of Labor Statistics, Thousands of Jobs, Seasonally Adjusted Data through June 2015.



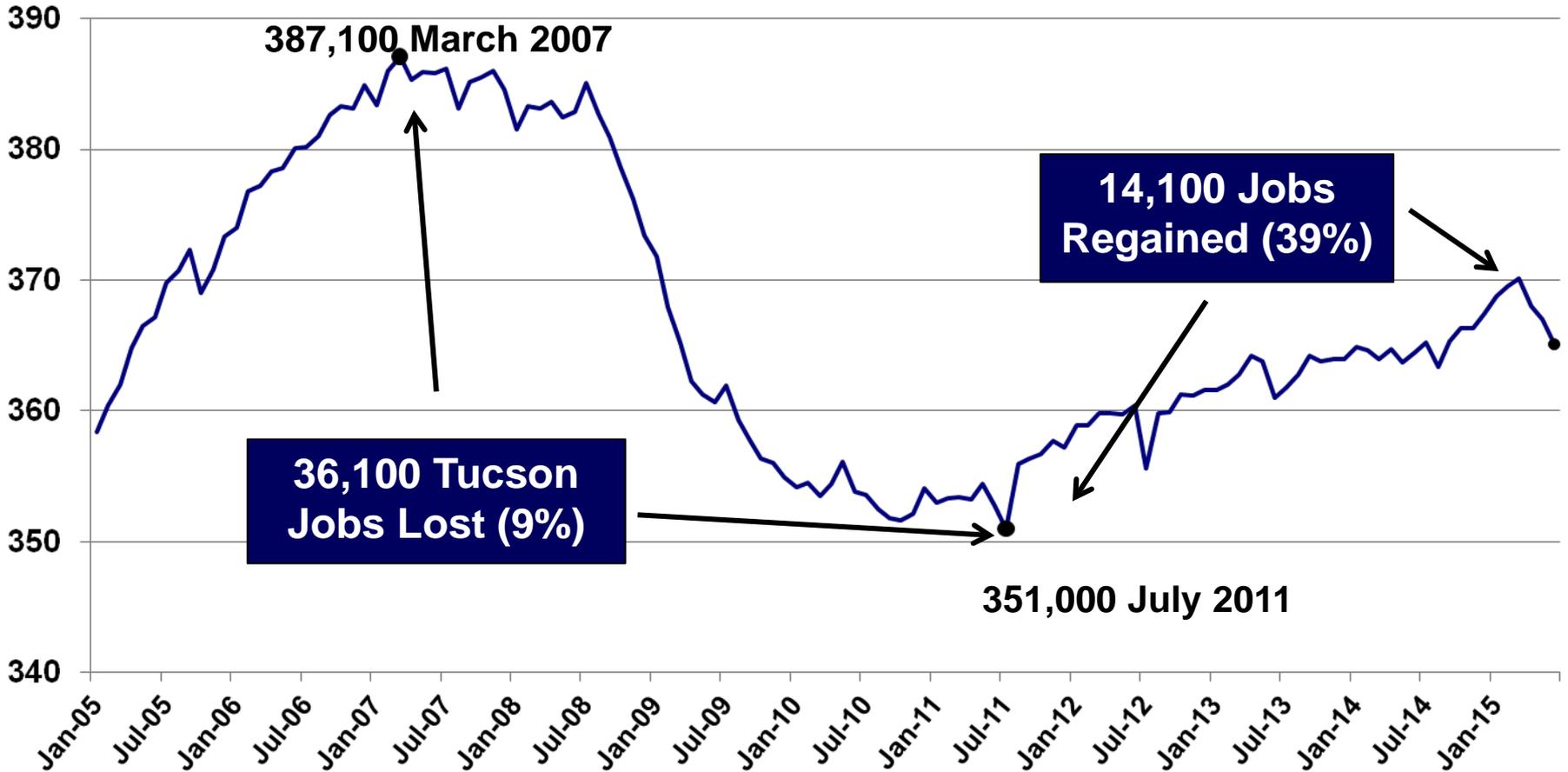
# Greater Phoenix Has Gained 88% of Lost Jobs 29,700 Jobs (12%) Still to Recover



Source: U.S. Bureau of Labor Statistics, Thousands of Jobs, Seasonally Adjusted Data through June 2015.



# Greater Tucson Has Gained 39% of Lost Jobs 22,000 Jobs (61%) Still to Recover



Source: U.S. Bureau of Labor Statistics, Thousands of Jobs, Seasonally Adjusted Data through June 2015.



# Arizona Jobs Regained Since Bottom of Cycle— Most Industries Yet to Regain Lost Jobs

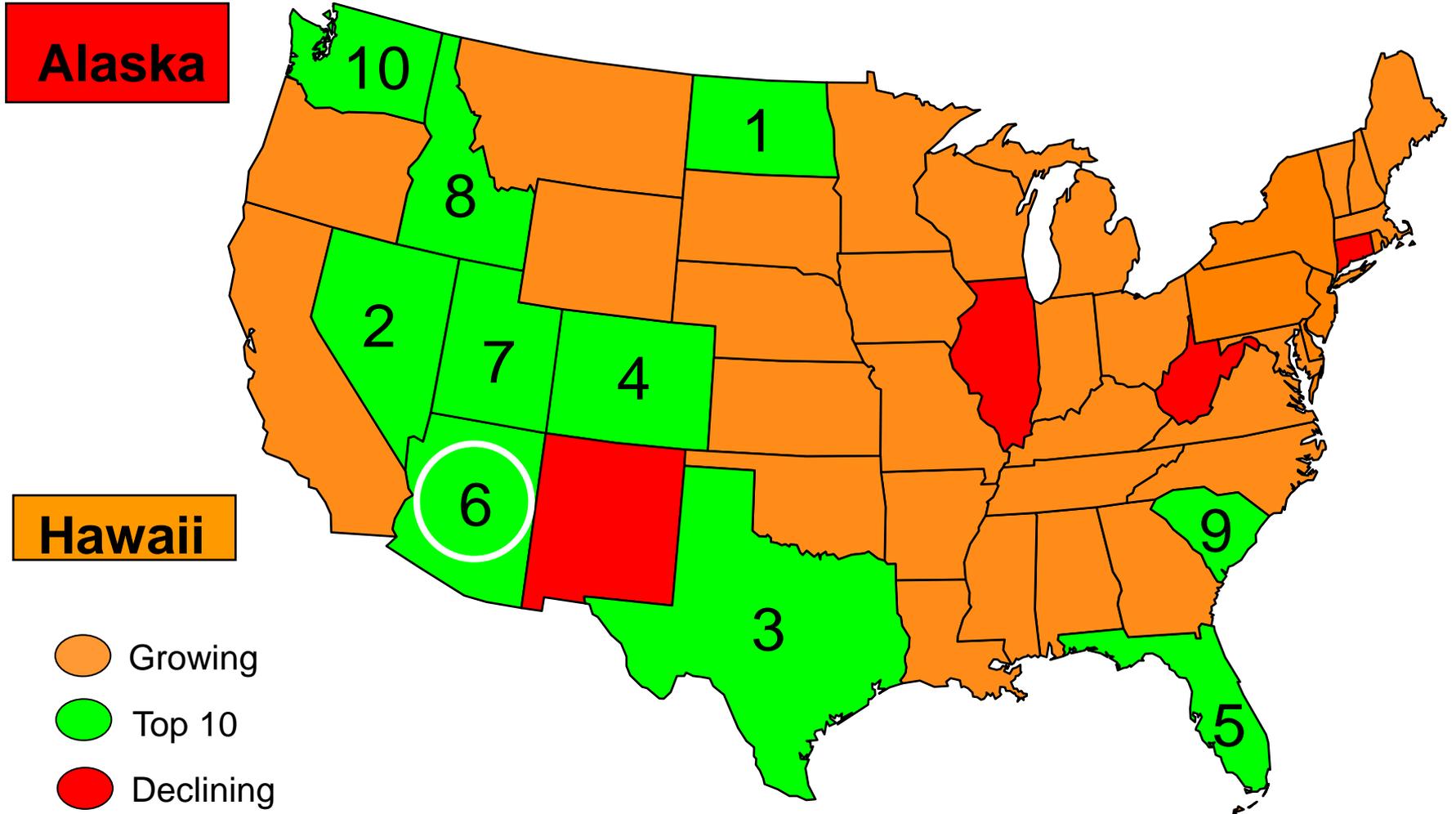


Source: U.S. Bureau of Labor Statistics, Thousands of Jobs, Seasonally Adjusted, as of June 2015.



# Population Growth 2014

Source: U.S. Census Bureau



Hawaii

- Growing
- Top 10
- Declining

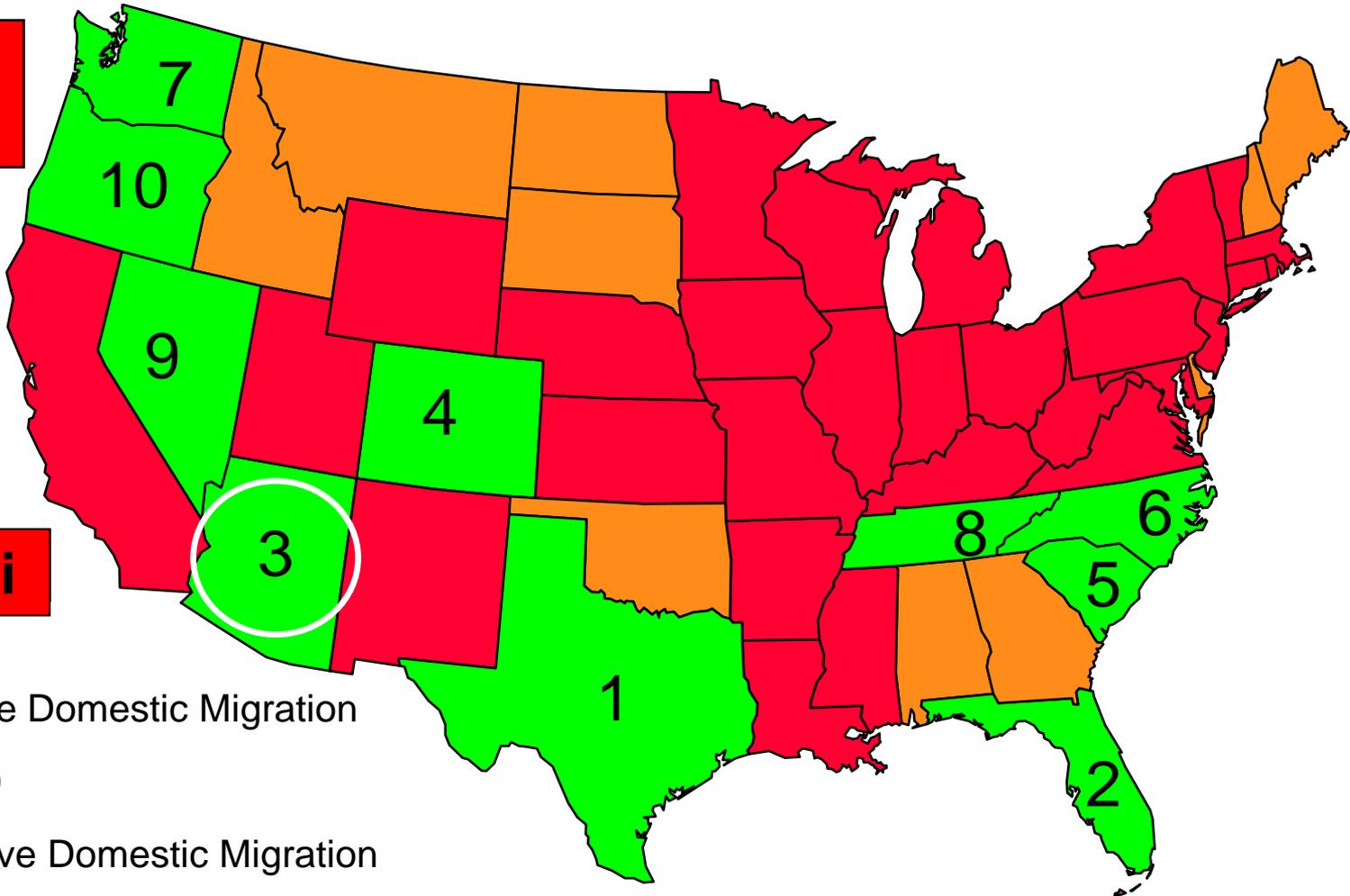
# Domestic Migrant Ranking 2014

Source: U.S. Census Bureau

Alaska

Hawaii

- Positive Domestic Migration
- Top 10
- Negative Domestic Migration



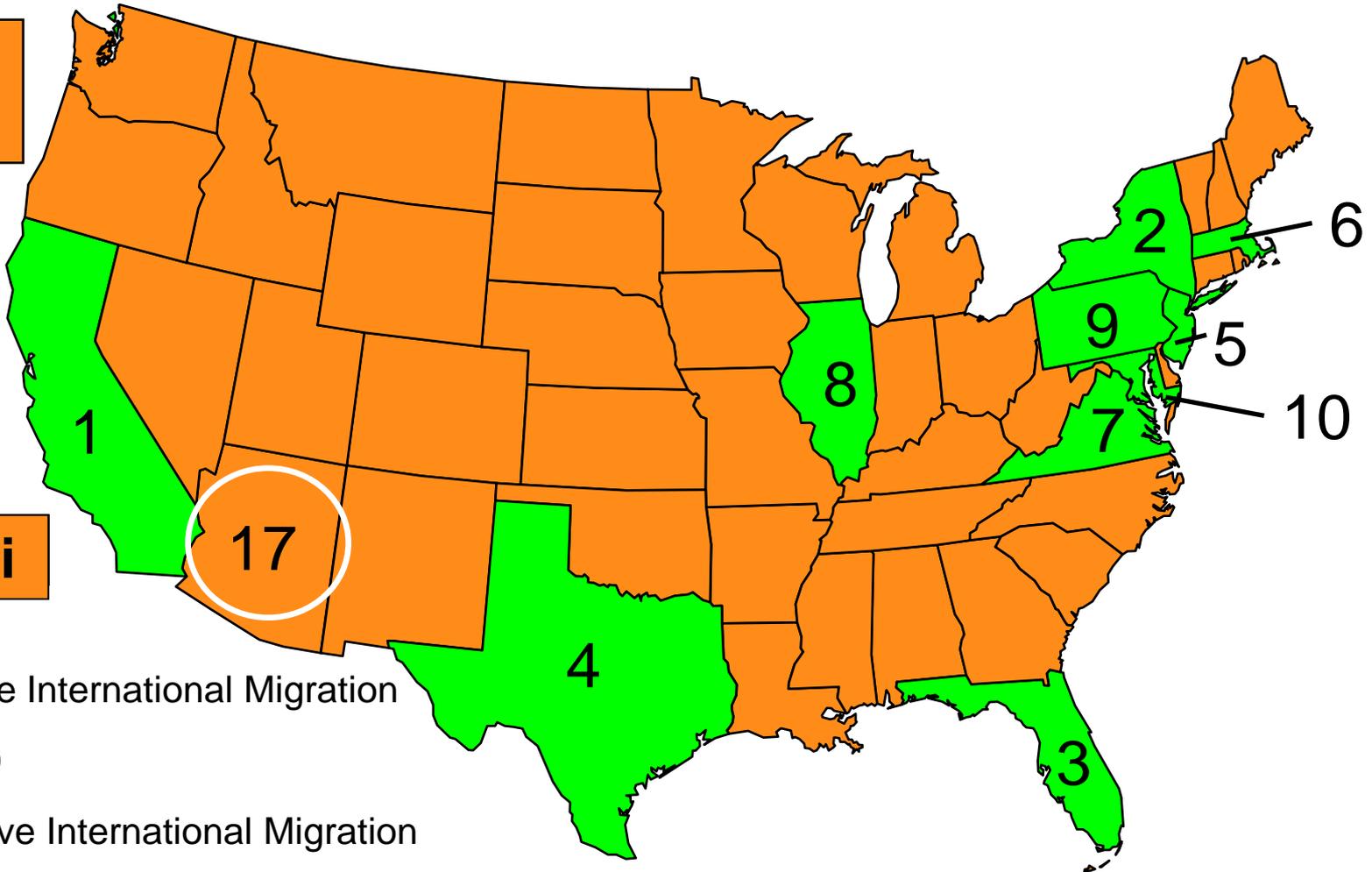
# International Migrant Ranking 2014

Source: U.S. Census Bureau

Alaska

Hawaii

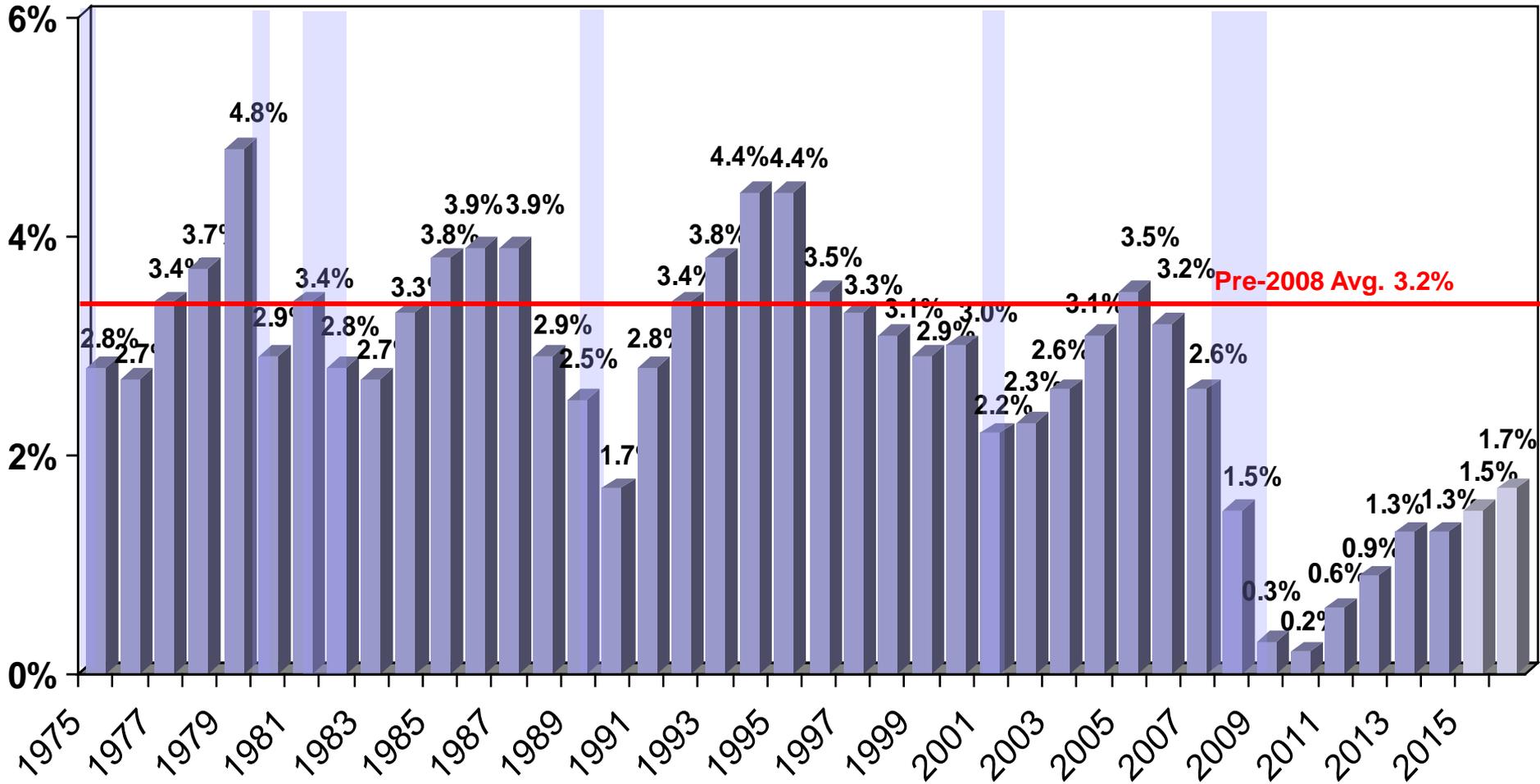
- Positive International Migration
- Top 10
- Negative International Migration



# Arizona Population Annual Percent Change 1975–2016\*

Source: AZ Dept. of Administration, EDPCo

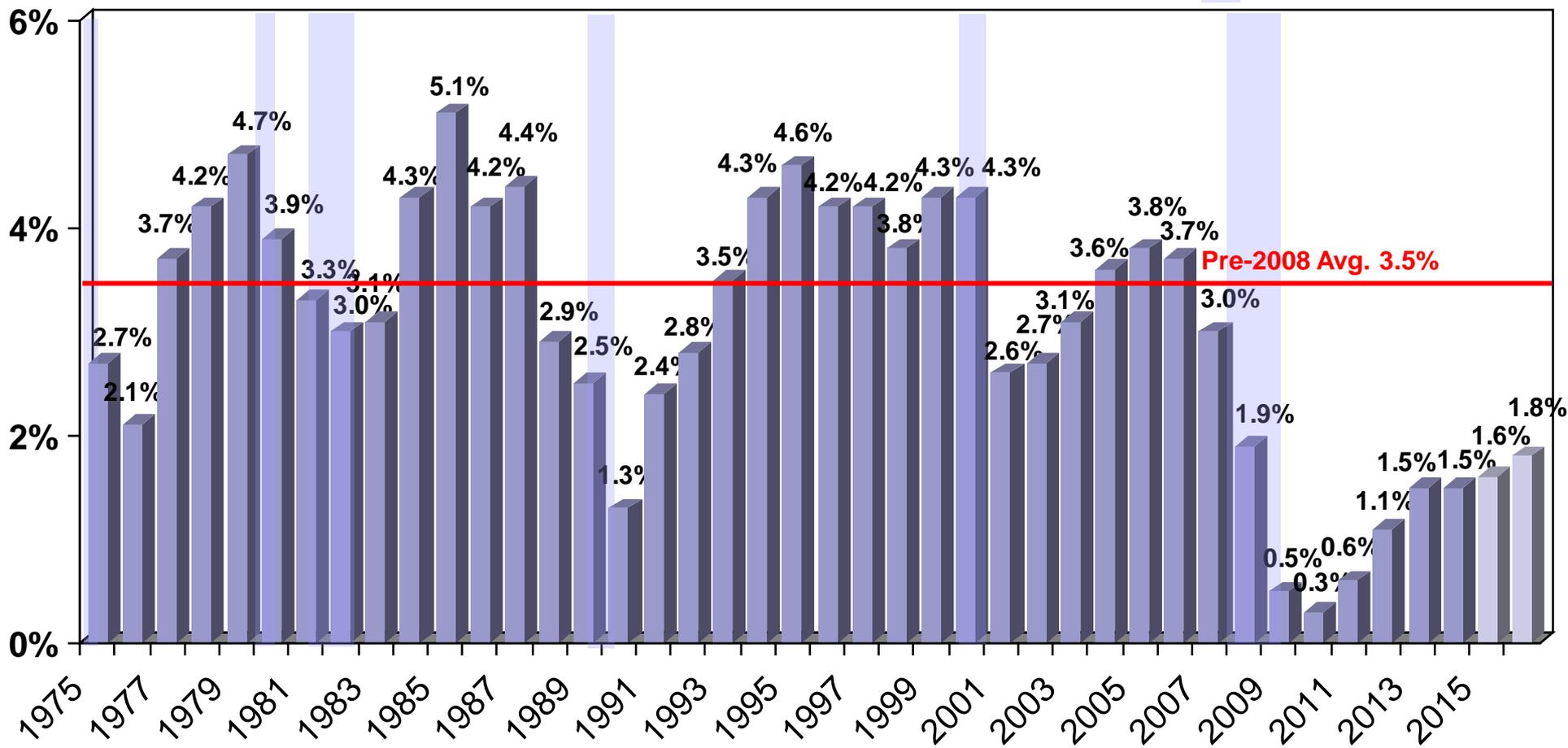
Recession Periods



# Greater Phoenix Population Annual Percent Change 1975–2016\*

Source: AZ Dept. of Administration, EDPCo

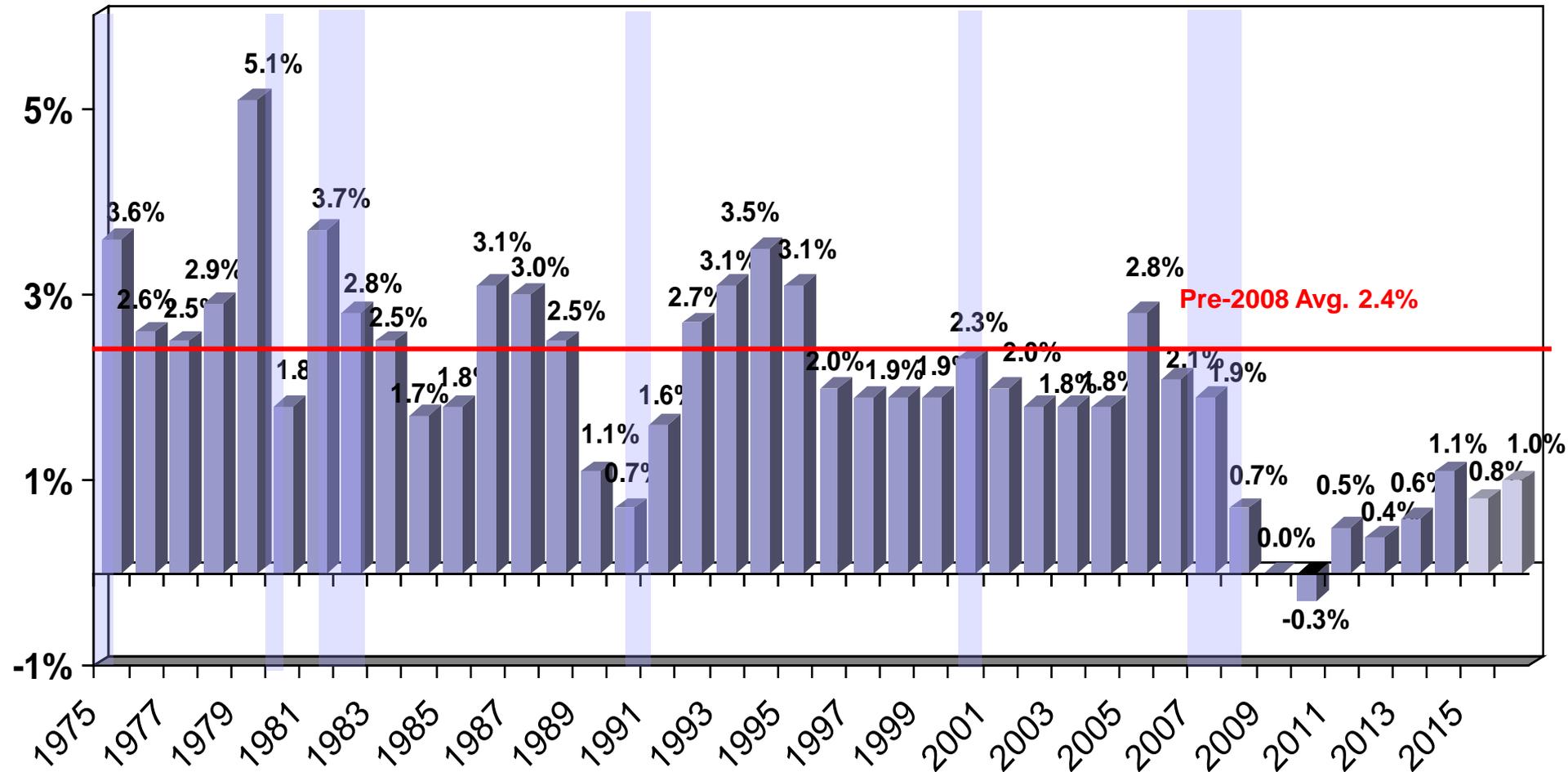
Recession Periods



# Greater Tucson Population Annual Percent Change 1975–2016\*

Source: AZ Dept. of Administration, U of A

Recession Periods



\*2015 & 2016 forecasts from the University of Arizona as of the third quarter 2015.

# How quickly are population flows going to recover?

- (1) US Economy? **Stronger (?)**.
- (2) Local Jobs? **Improving**.
- (3) Financial Issues? **Around the corner...**



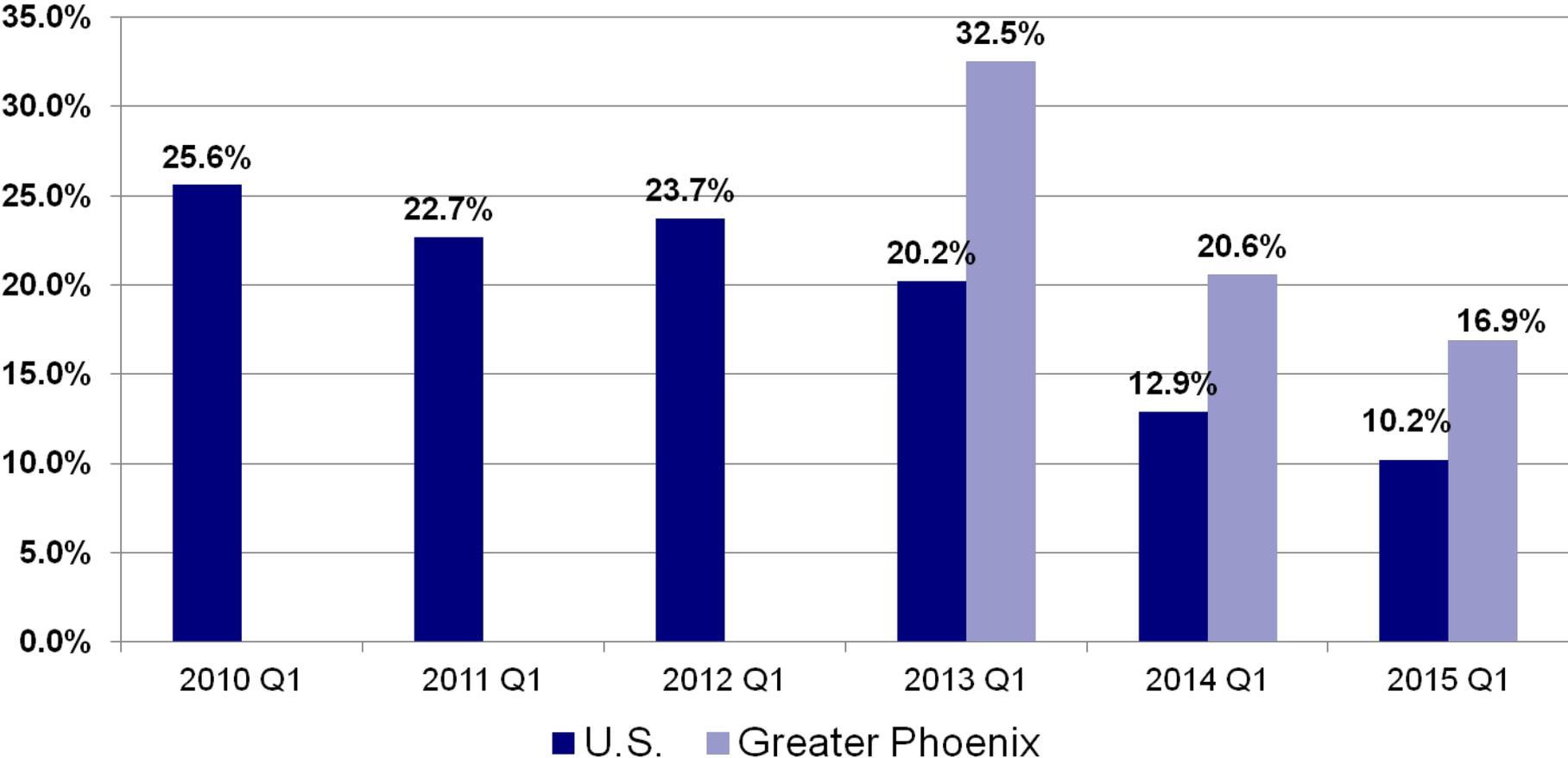
# Why aren't people moving/ buying?

- Negative Equity,
- “Penalty Box”,
- Financing,
- Millennials.



# U.S. and Greater Phoenix Negative Equity Share 2010–2015

Source: CoreLogic

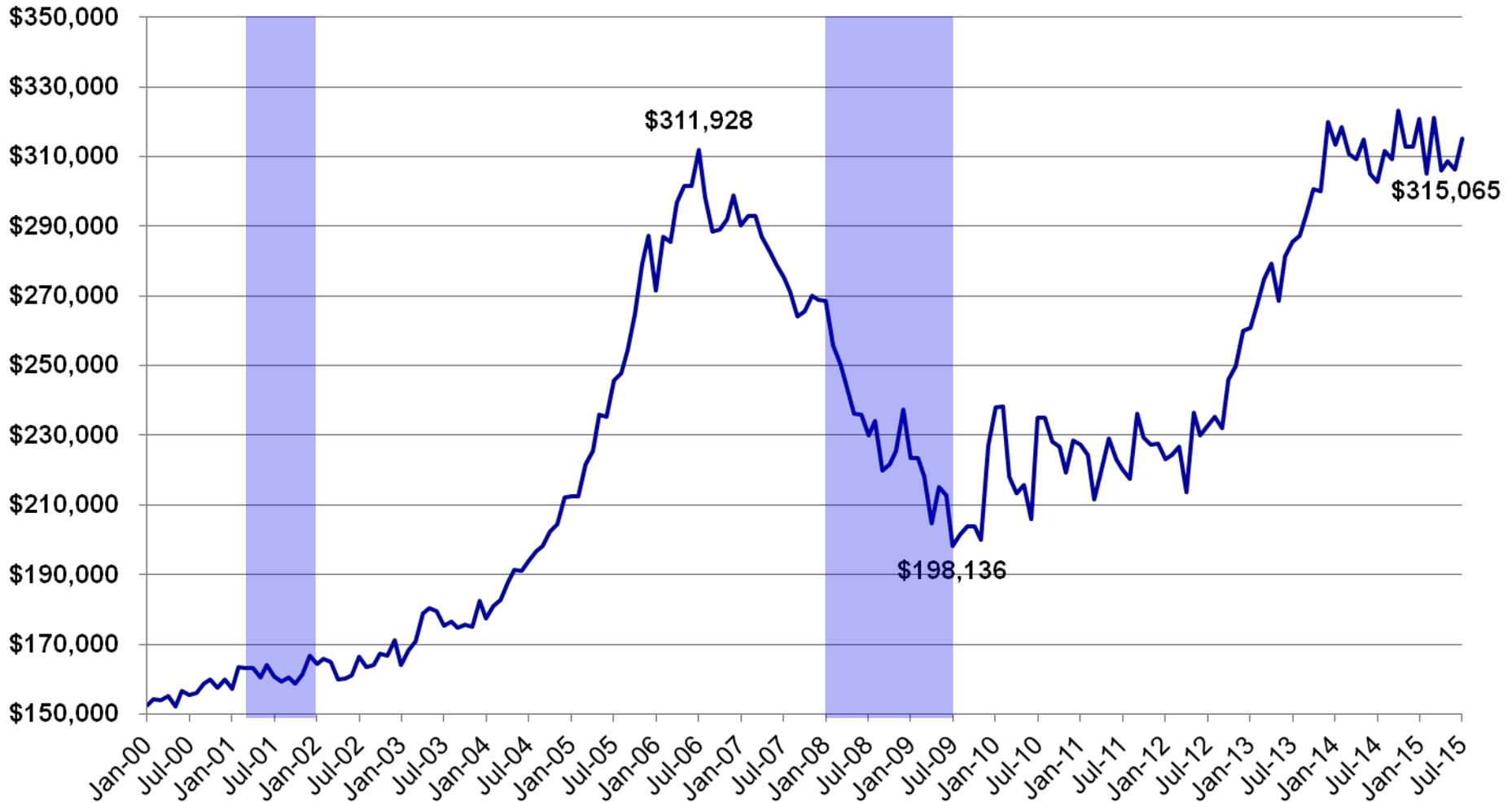


Greater Phoenix data prior to 2013 Q1 not available.

# Greater Phoenix Median Price of New Homes 2000-2015\*

Source: Information Market

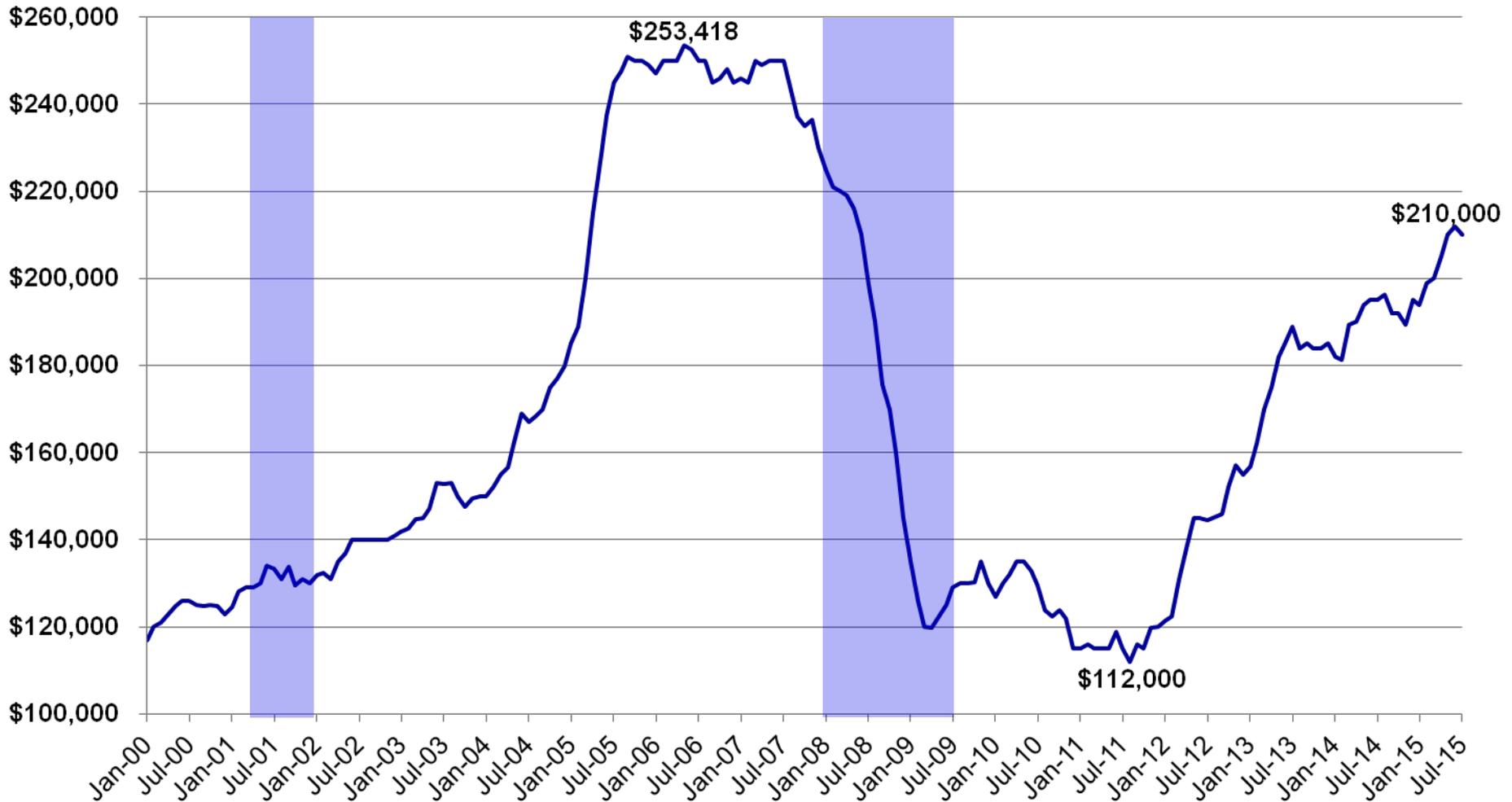
Recession Periods



# Greater Phoenix Median Price of Resale Homes 2000-2015\*

Source: Information Market

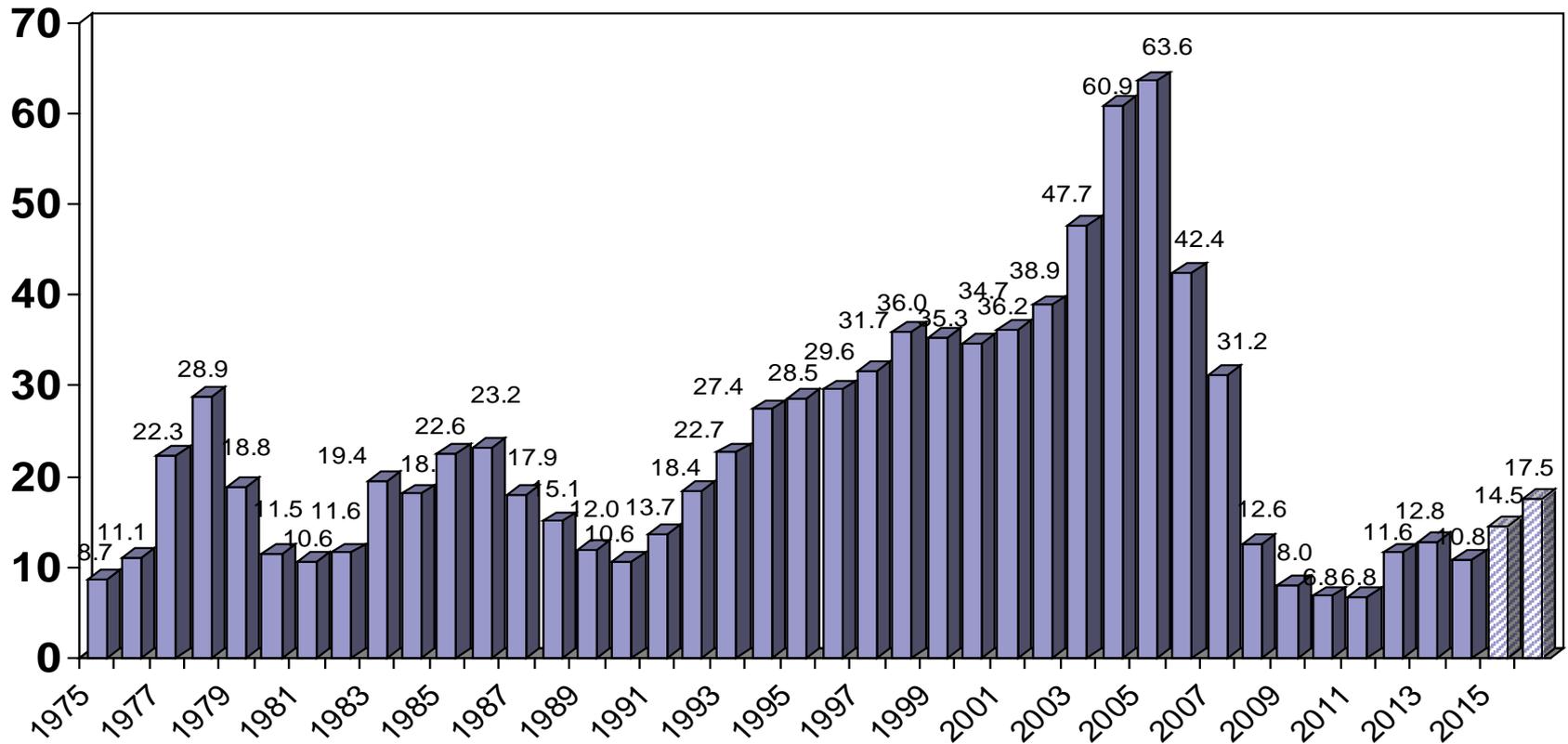
Recession Periods



# Single Family Permits Greater Phoenix 1975–2016\*

Source: RL Brown & Elliott D. Pollack & company

# Permits  
(000)

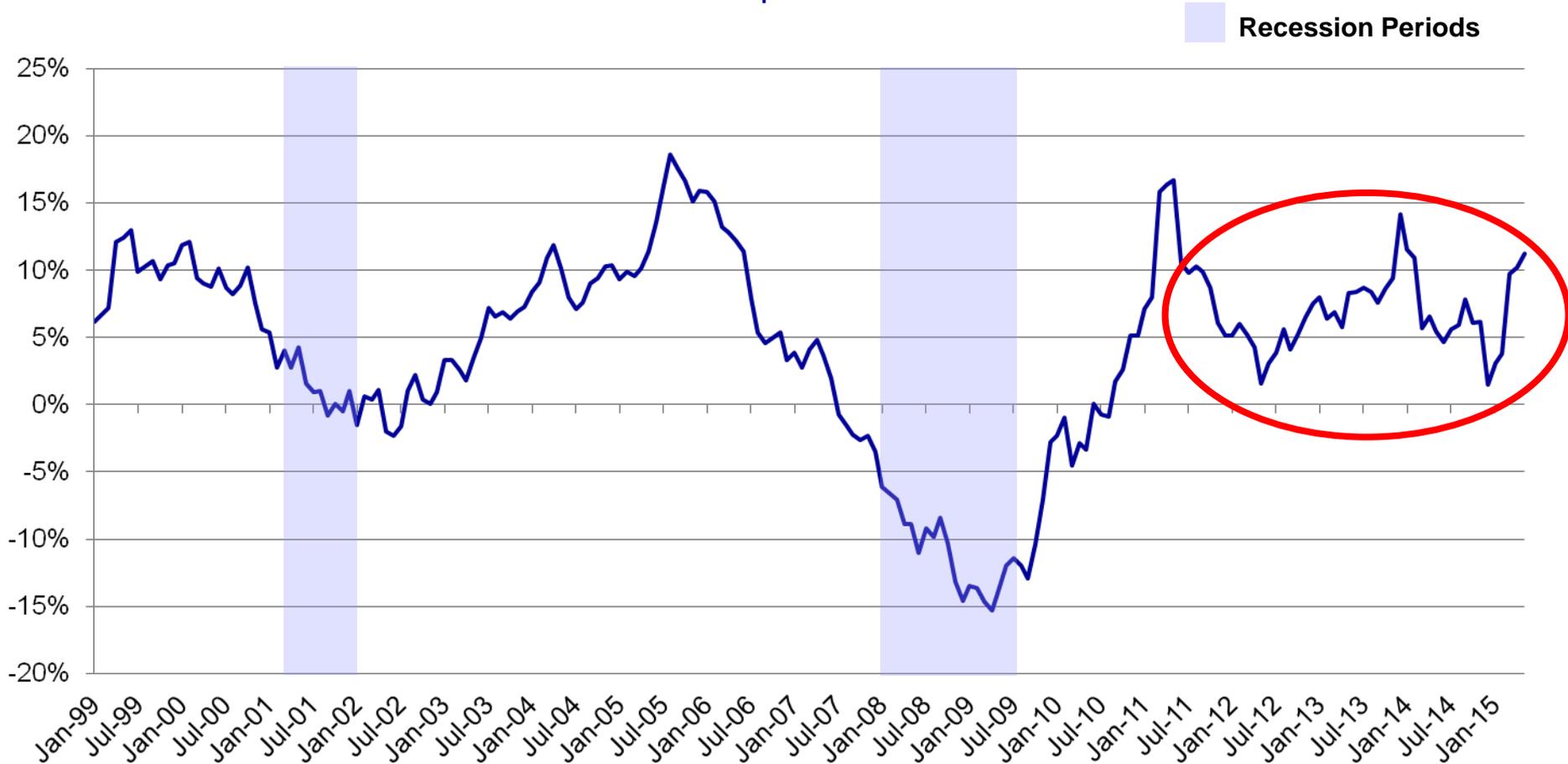


\*2015 and 2016 forecast is from *Elliott D. Pollack & Company* as of second quarter 2015.



# Maricopa County Retail Sales Percent Change Year Ago\* 1999 – 2015\*\*

Source: Arizona Department of Revenue

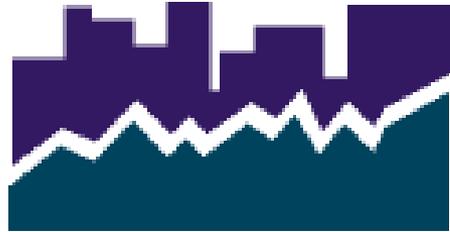


\*Data through May 2015

\*\*3-month moving average

Note: January 2010 and March 2010 retail sales are estimates.





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