

# Budget Stress Testing in Utah

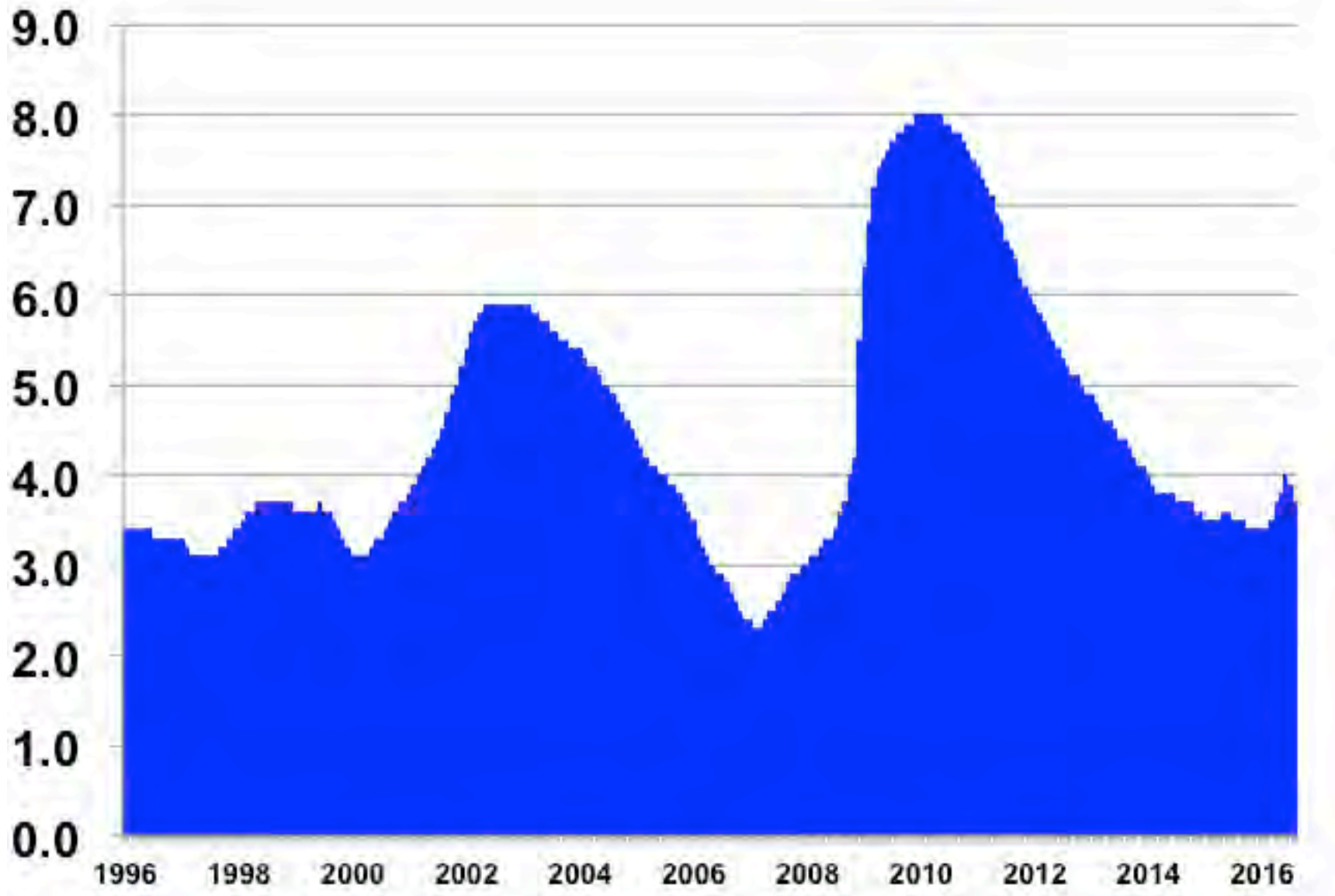
October 19, 2016

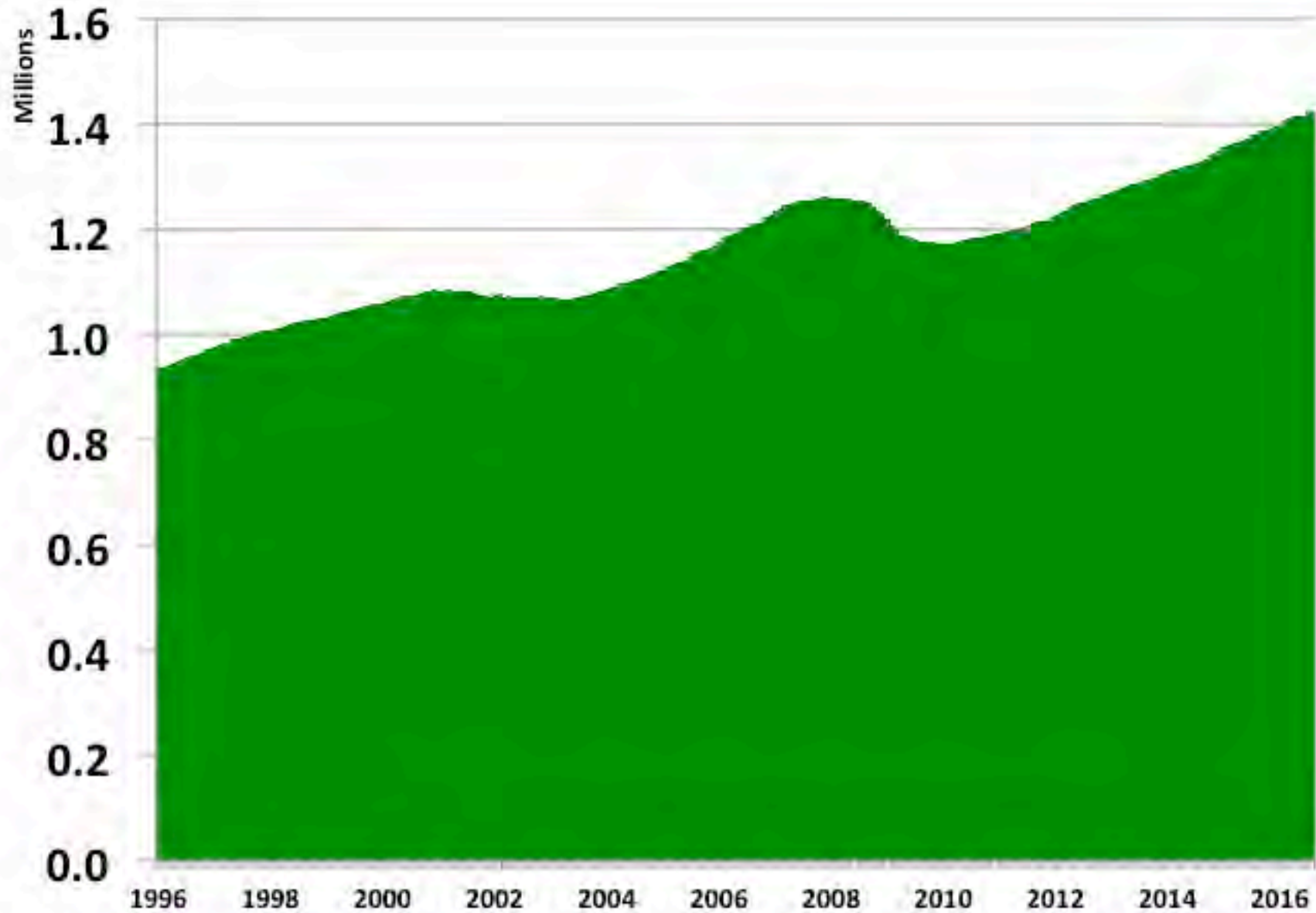
Federation of Tax Administrators  
Revenue Estimating Conference

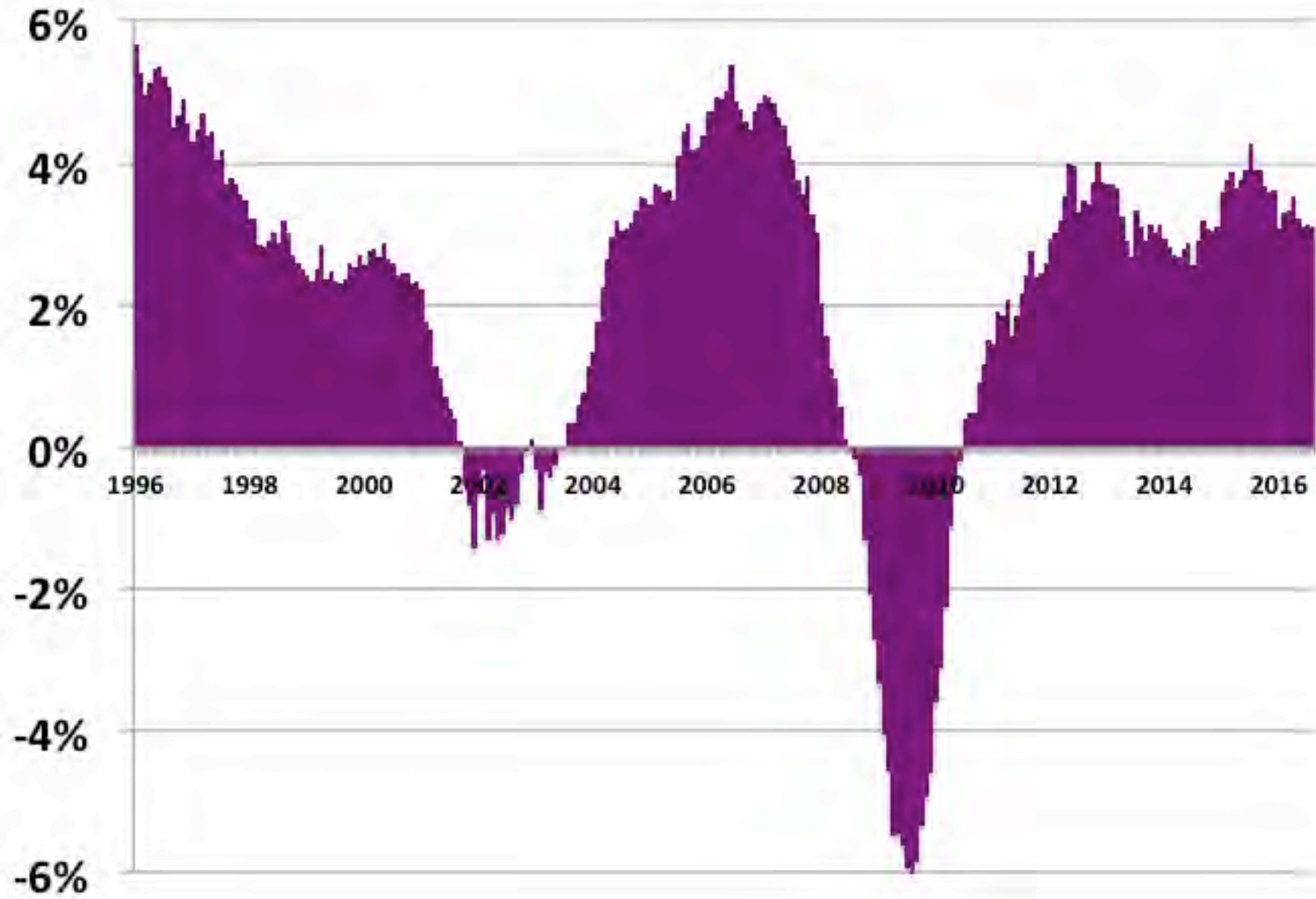


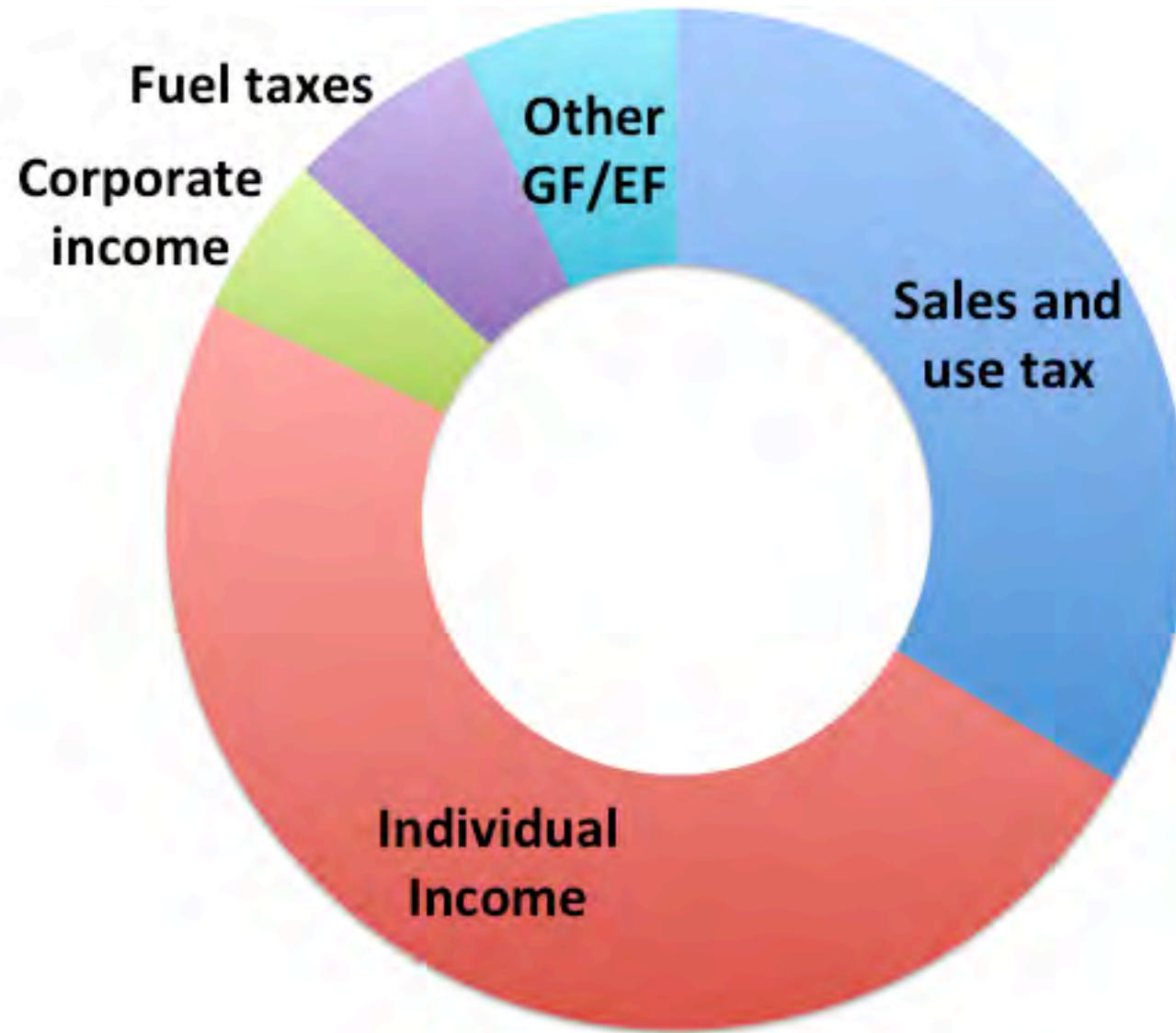
# Background & Context

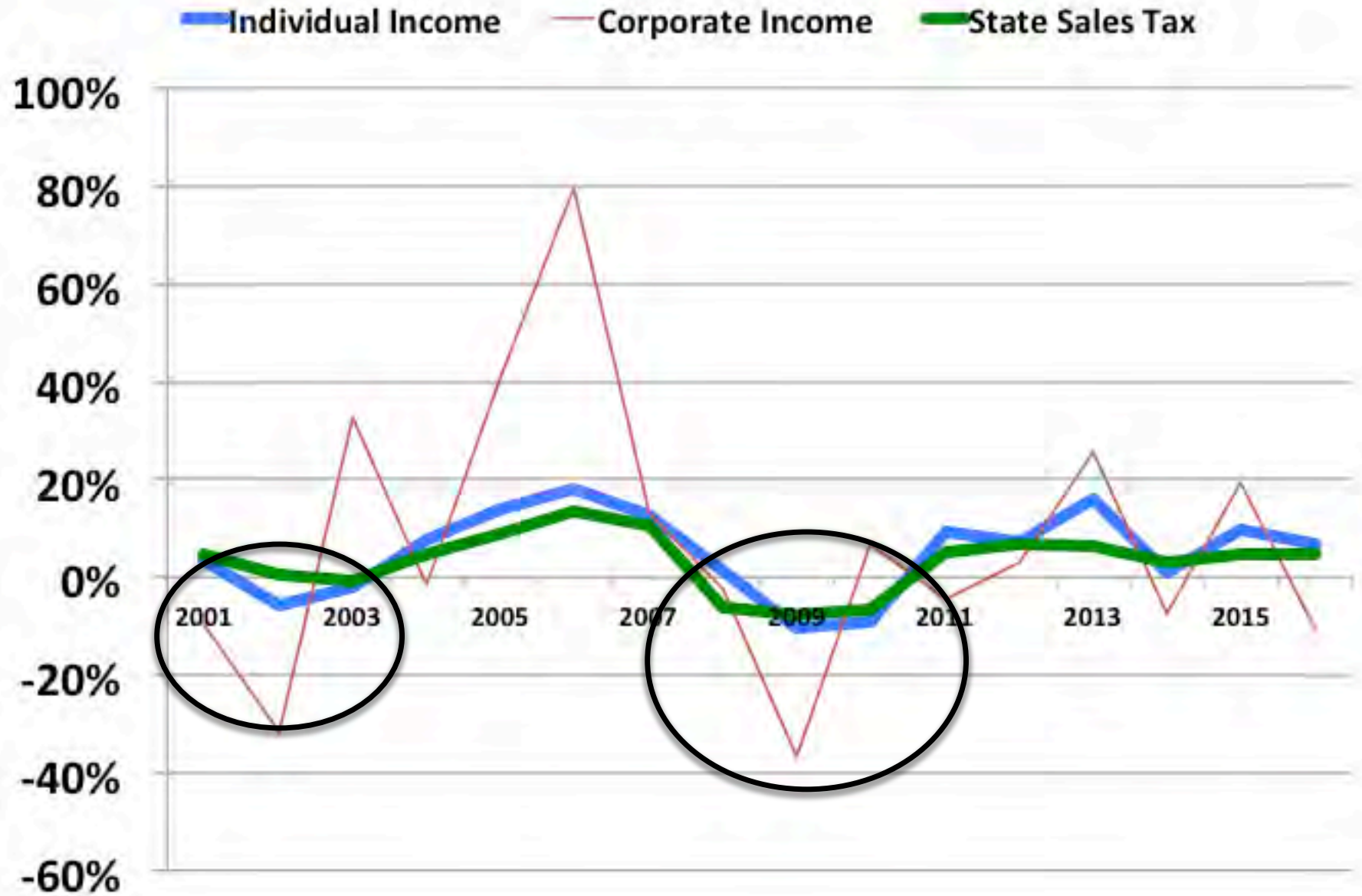












- Unstable economic conditions impact government revenues
- Tax policy amplifies economic instability
- Expenditure patterns countercyclical
- Expectations of stable government services










- Structural balance
  - Separating ongoing and one-time revenues
- Timing of spending compared to revenues
- Spending reductions
- Revenue adjustments – tax base, tax rate, fees


- Budget reserves – broadly defined
  - Unappropriated balances
  - Operating reserves
  - “Working rainy day funds” (ongoing \$ for capital)
  - Nonlapsing balances
  - Restricted fund balances
  - Formal rainy day funds
  - Permanent trust funds
  - Bonding capacity



# Budget Stress Testing



- Formal review of “playbook” in a downturn
- Used consensus process
  - Revenues – GOMB, LFA, Tax Commission
  - Expenditures – GOMB and LFA
- Modeled how state budget might respond to economic scenarios
  -  –Revenues & expenditures
- Categorized budget reserves

- Used Federal Reserve bank stress test economic scenarios
  - Adverse
  - Severely adverse (“Severe”)
- Not exactly aligned with indicators used in normal revenue estimating process
  -  –Each entity independently adjusted from Federal Reserve economic indicators to revenue indicators





# Stress Testing – Economic Assumptions



2015 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule

October 23, 2014

**Table 2A. Supervisory adverse scenario: Domestic, Q1:2001–Q4:2017**

Percent unless otherwise indicated.

Date	Real GDP growth	Nominal GDP growth	Real disposable income growth	Nominal disposable income growth	Unemployment rate	CPI inflation rate	3-month Treasury rate	5-year Treasury yield	10-year Treasury yield	BBB corporate yield	Mortgage rate	Prime rate	Level			
													Dow Jones Total Stock Market Index	House Price Index	Commercial Real Estate Price Index	Market Volatility Index
Q4 2013	3.5	5.0	0.2	1.2	7.0	1.1	0.1	1.4	2.8	4.8	4.3	3.3	19413.2	166.4	229.2	20.3
Q1 2014	-2.1	-0.8	3.4	4.8	6.7	1.9	0.0	1.6	2.8	4.6	4.4	3.3	19711.2	169.7	227.6	21.4
Q2 2014	4.6	6.8	4.4	6.8	6.2	3.0	0.0	1.7	2.7	4.3	4.2	3.3	20568.7	170.8	233.0	17.0
Q3 2014	3.1	3.8	2.7	3.6	6.1	1.1	0.0	1.7	2.5	4.2	4.1	3.3	20458.8	172.1	236.0	17.0
Q4 2014	-0.6	1.1	0.0	2.0	6.4	2.5	0.7	2.6	3.3	5.7	5.1	3.9	19418.4	170.8	238.9	28.9
Q1 2015	-1.3	0.9	-0.4	2.2	6.9	3.0	1.2	2.9	3.7	6.5	5.7	4.3	18508.7	168.0	235.3	32.9
Q2 2015	-0.2	2.8	-0.3	2.7	7.2	3.5	1.6	3.3	4.0	6.9	6.1	4.7	17689.2	164.8	228.1	33.2
Q3 2015	0.2	3.8	-0.1	3.5	7.4	4.0	2.1	3.7	4.3	7.0	6.3	5.2	16983.8	161.2	220.8	27.3
Q4 2015	0.3	4.1	0.0	3.6	7.6	4.0	2.6	4.0	4.6	7.1	6.6	5.7	16257.8	157.7	214.8	24.9
Q1 2016	0.8	4.3	1.0	4.7	7.8	4.0	3.1	4.3	4.8	7.4	6.8	6.2	15737.3	154.5	207.7	24.6
Q2 2016	1.2	4.9	1.1	4.8	7.9	4.0	3.6	4.5	5.0	7.5	7.0	6.7	15430.8	151.7	202.9	22.8
Q3 2016	1.7	5.4	1.4	5.1	7.9	4.0	4.0	4.8	5.2	7.5	7.1	7.1	15188.2	150.0	199.6	21.4
Q4 2016	1.8	5.4	1.5	5.2	8.0	4.0	4.4	5.0	5.4	7.6	7.3	7.5	14992.3	148.9	197.7	20.5
Q1 2017	1.8	5.4	1.8	5.5	8.0	4.0	4.7	5.2	5.5	7.6	7.4	7.8	14866.4	148.6	196.6	19.8
Q2 2017	1.9	5.5	1.6	5.2	8.0	3.9	5.0	5.3	5.7	7.7	7.5	8.0	14791.4	148.9	196.5	19.4
Q3 2017	2.0	5.5	1.6	5.1	8.0	3.8	5.2	5.5	5.8	7.7	7.6	8.2	14807.1	149.5	196.6	19.1
Q4 2017	2.2	5.5	1.7	5.1	8.0	3.6	5.3	5.5	5.8	7.7	7.6	8.4	15005.9	150.3	197.1	19.2

Note: Refer to Notes Regarding Scenario Variables for more information on variables.

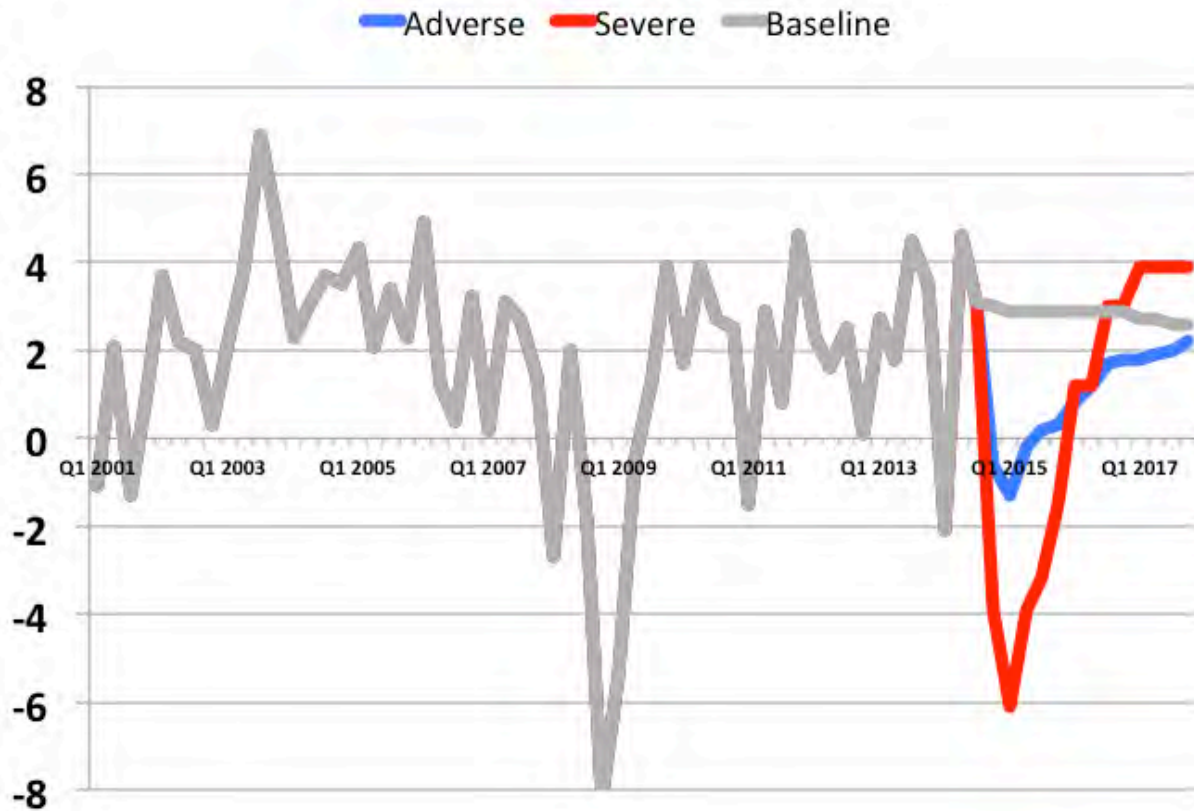
**Table 3A. Supervisory severely adverse scenario: Domestic, Q1:2001–Q4:2017**

Percent unless otherwise indicated.

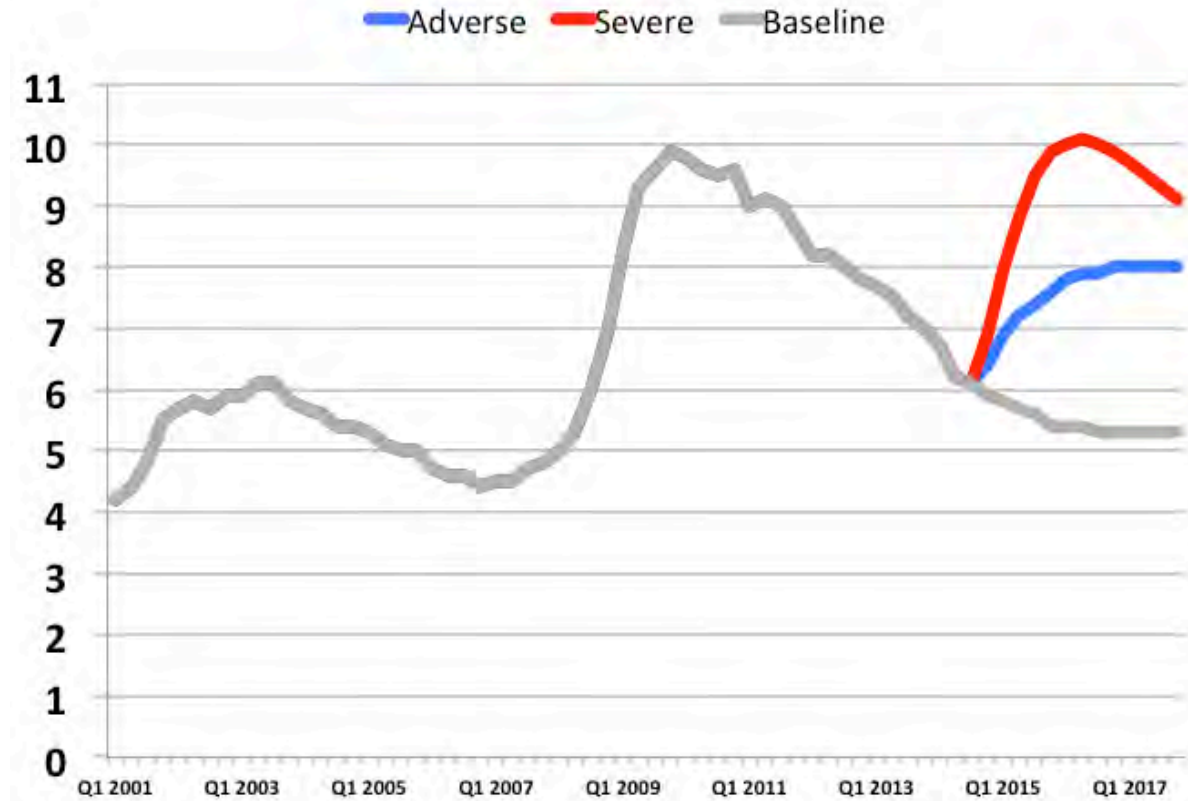
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Q2 2014	4.6	6.8	4.4	6.8	6.2	3.0	0.0	1.7	2.7	4.3	4.2	3.3	20568.7	170.8	233.0	17.0
Q3 2014	3.1	3.8	2.7	3.6	6.1	1.1	0.0	1.7	2.5	4.2	4.1	3.3	20458.8	172.1	236.0	17.0
Q4 2014	-3.9	-2.8	-3.0	-0.1	6.9	4.3	0.1	0.4	0.9	4.7	4.2	3.3	17133.5	169.5	238.9	79.0
Q1 2015	-6.1	-4.7	-4.4	-2.3	8.0	3.0	0.1	0.4	1.0	5.6	4.6	3.3	12498.5	164.0	230.2	71.3
Q2 2015	-3.9	-2.4	-3.4	-2.2	8.8	1.7	0.1	0.4	1.2	6.0	4.8	3.3	10190.1	157.6	213.6	76.9
Q3 2015	-3.2	-1.7	-2.4	-1.4	9.5	1.3	0.1	0.4	1.3	6.3	5.0	3.3	8770.7	150.7	195.1	68.1
Q4 2015	-1.5	0.0	-1.5	-0.7	9.9	1.1	0.1	0.4	1.5	6.2	5.0	3.2	8606.3	144.3	177.6	48.1
Q1 2016	1.2	2.4	0.2	1.5	10.0	1.6	0.1	0.5	1.5	6.0	4.9	3.2	9087.3	138.4	164.4	38.4
Q2 2016	1.2	2.5	0.4	1.8	10.1	1.9	0.1	0.6	1.6	5.8	4.8	3.2	9607.2	133.4	157.4	30.7
Q3 2016	3.0	4.4	1.2	2.8	10.0	2.0	0.1	0.8	1.8	5.6	4.8	3.2	10480.7	130.4	154.4	25.5
Q4 2016	3.0	4.3	1.8	3.3	9.9	1.9	0.1	0.9	1.9	5.5	4.7	3.2	11521.4	128.4	154.6	21.6
Q1 2017	3.9	5.2	2.7	4.2	9.7	1.9	0.1	1.1	2.0	5.3	4.7	3.2	12894.7	127.9	156.1	18.7
Q2 2017	3.9	5.2	2.8	4.1	9.5	1.7	0.1	1.2	2.1	5.2	4.7	3.2	14079.2	128.4	159.6	17.6
Q3 2017	3.9	5.1	2.9	4.2	9.3	1.6	0.1	1.3	2.2	5.1	4.7	3.2	15430.3	129.5	164.0	16.4
Q4 2017	3.9	5.1	3.0	4.3	9.1	1.6	0.1	1.5	2.3	5.1	4.7	3.2	16487.6	131.0	169.1	16.5

Note: Refer to Notes Regarding Scenario Variables for more information on variables.

## US Real GDP Growth Rate



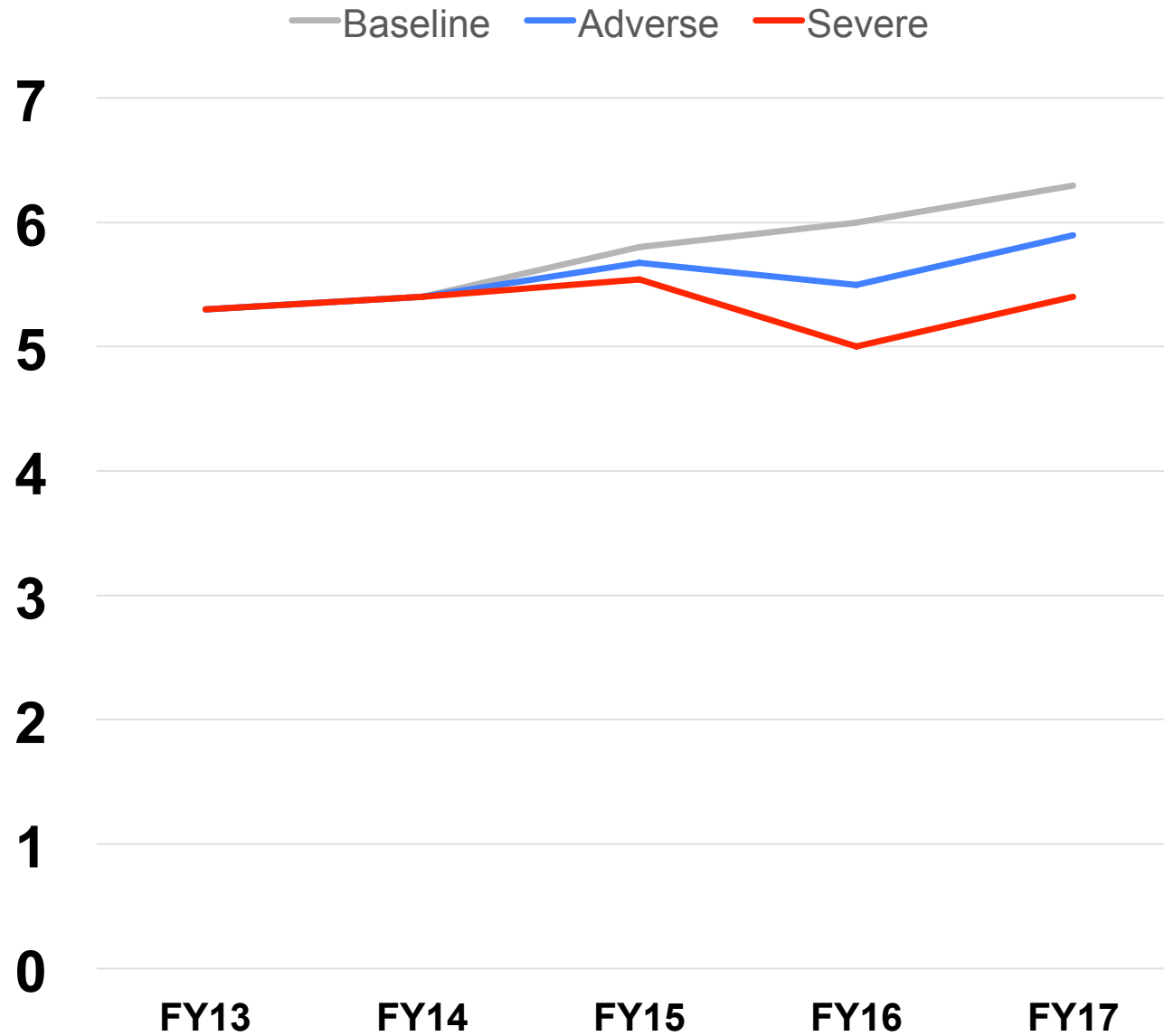
## US Unemployment Rate





- Focused on major tax types
  - Individual income
  - Sales and use
  - Corporate
- Ran through normal revenue estimation models

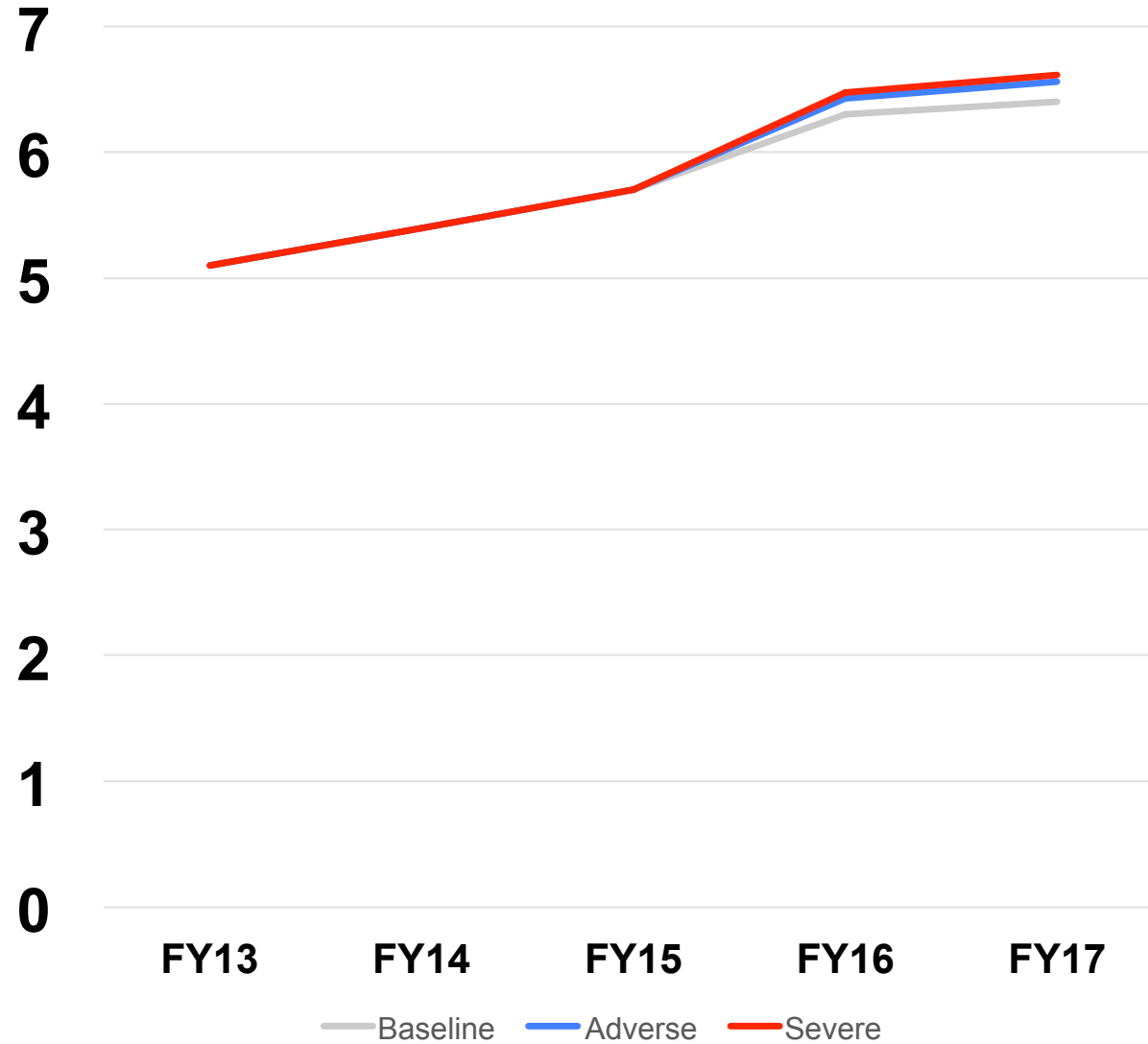




- Focused on major enrollment-driven programs
  - Medicaid
  - K-12 Education
  - Higher Education
- Interaction between demographics in Great Recession and economic factors



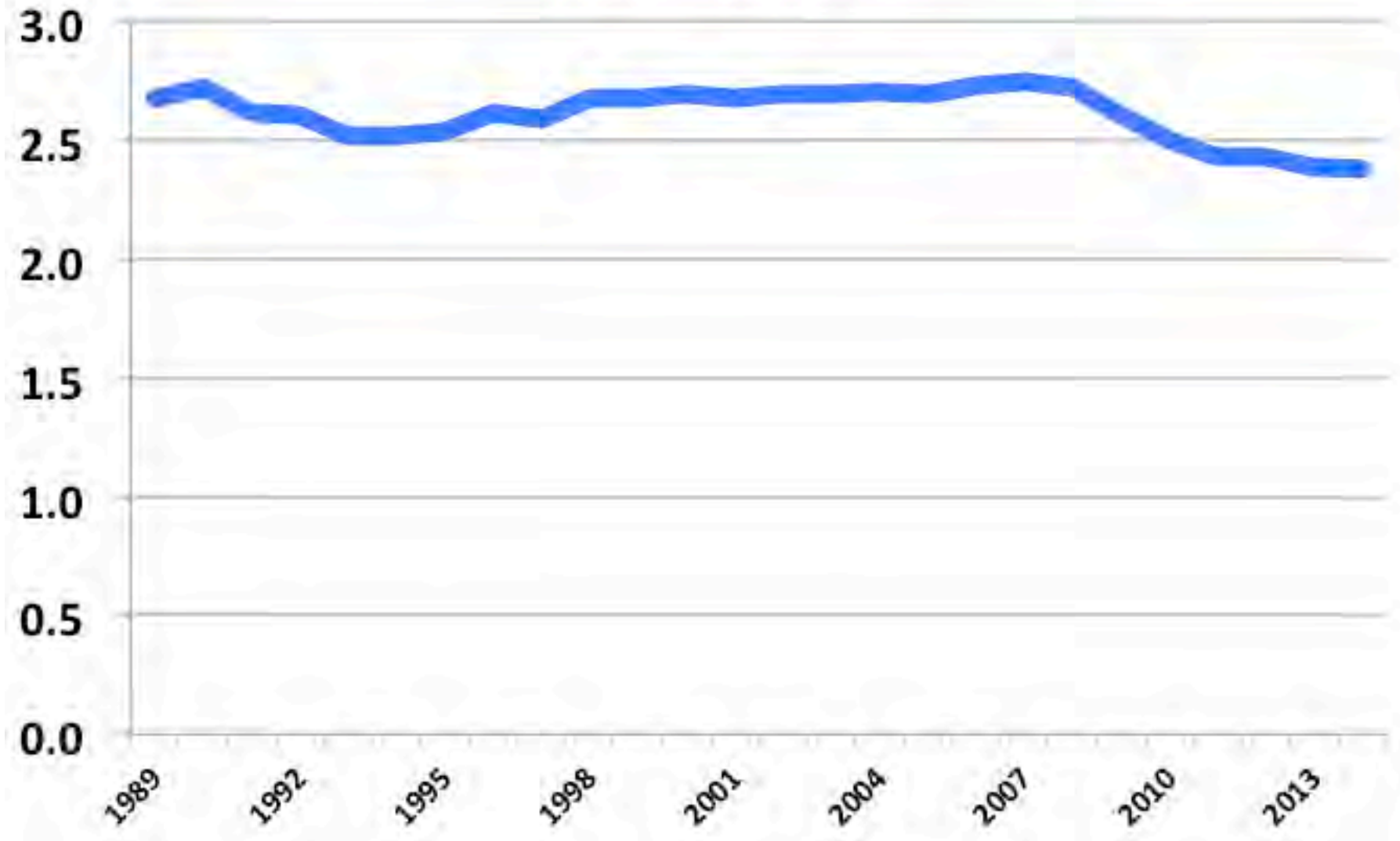
Expenditures (\$b)



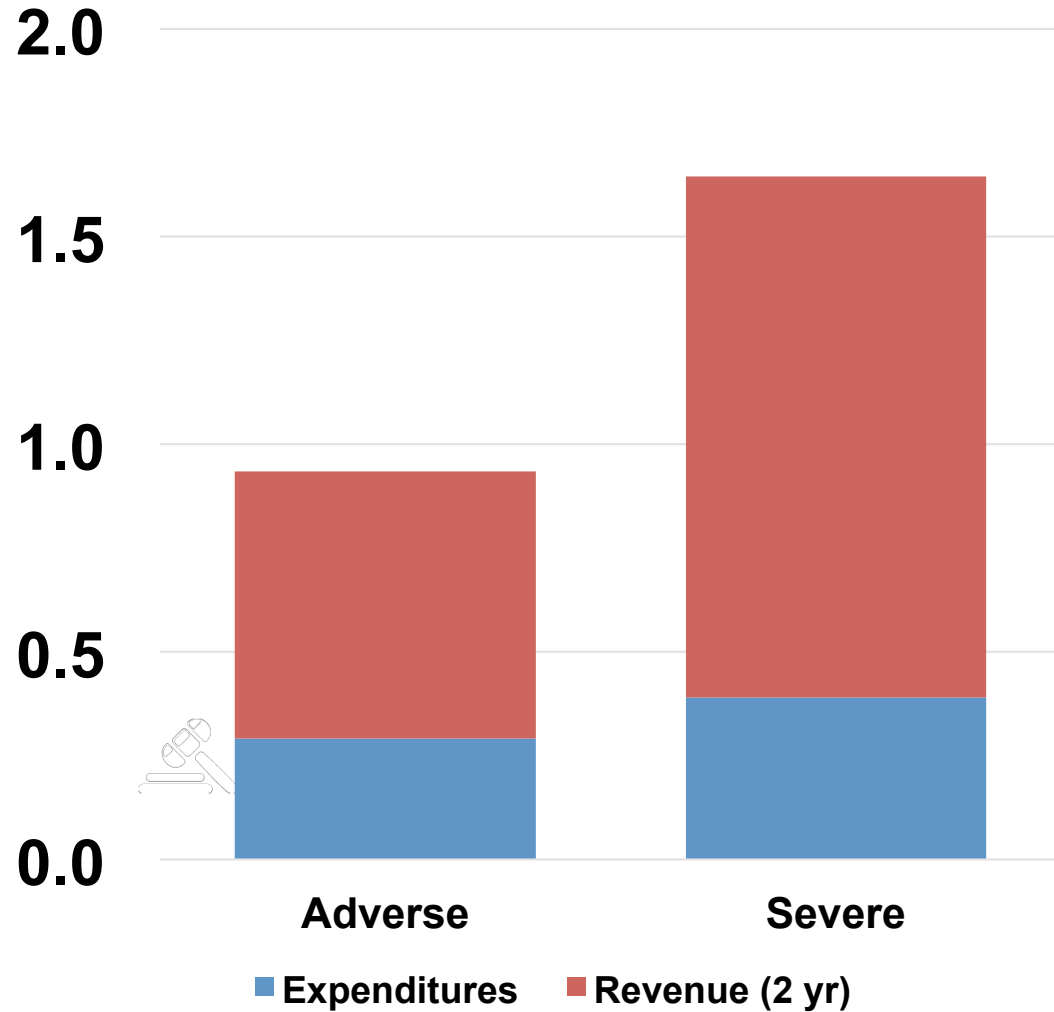
Change in School Enrollment  
and Difference in Births 5 and 17 Years Previous



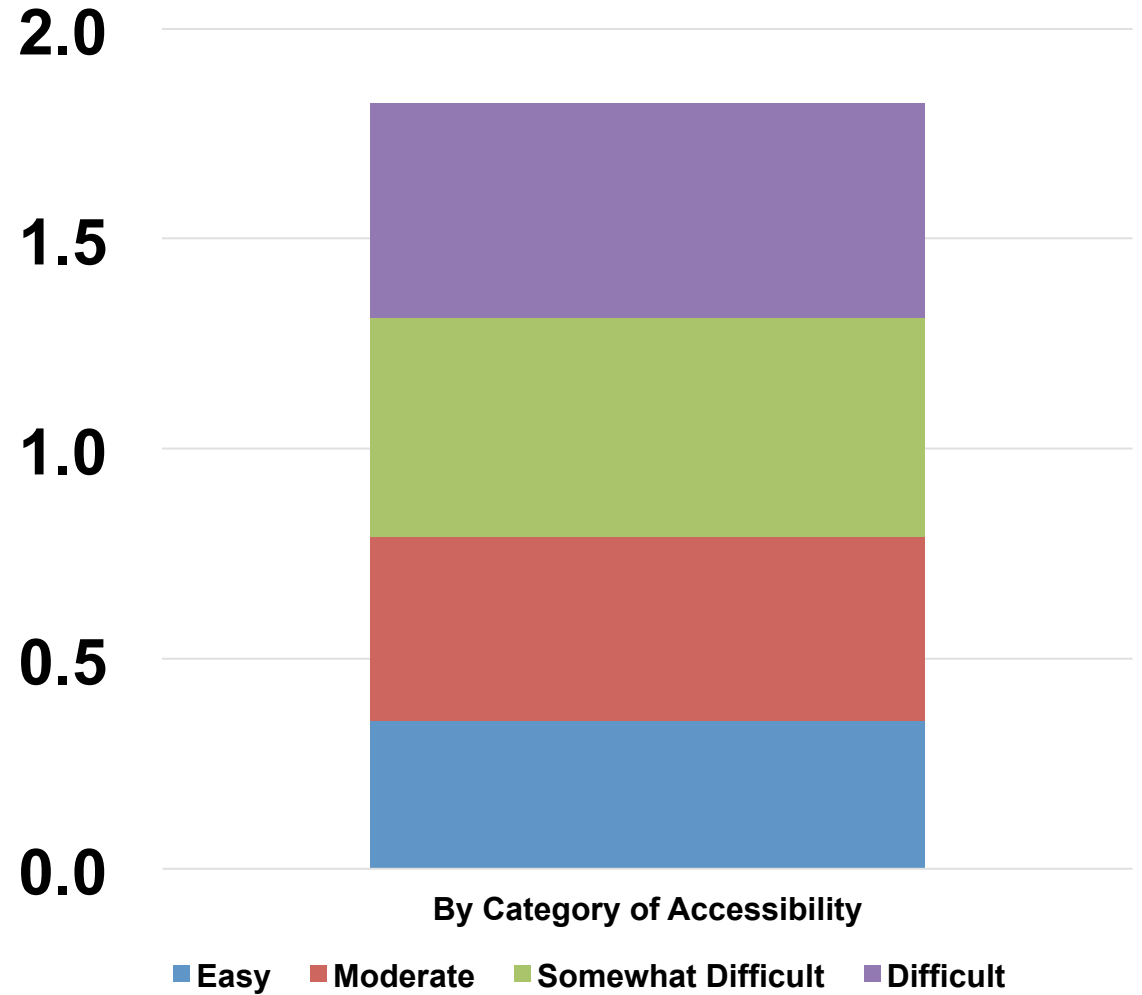
Fertility Rate



**Potential Exposure (\$b)**



**Reserves/Offsets (\$b)**



- Formal v. informal process
- High-level v. tons of detail in revenue and expenditure categories to review
- Selecting economic assumptions
- Defining budget reserves
- Examining time frame
- Speculating about future / considering probabilities
- Communicating results





# Thank you & contact information

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## September 16

ECONOMIC INDICATORS	UNITS	2014	2015	2016	2017	2018	PERCENT CHANGE			
		ACTUAL	ACTUAL	ESTIMATE	FORECAST	FORECAST	2015	2016	2017	2018
<b>PRODUCTION AND SPENDING</b>										
U.S. Real Gross Domestic Product	Billion Chained \$2009	15,982.3	16,397.2	16,645.7	17,052.7	17,466.9	2.6	1.5	2.4	2.4
U.S. Real Personal Consumption	Billion Chained \$2009	10,868.9	11,214.7	11,523.4	11,819.5	12,111.5	3.2	2.8	2.6	2.5
U.S. Real Private Fixed Investment	Billion Chained \$2009	2,660.6	2,767.8	2,792.1	2,922.2	3,065.1	4.0	0.9	4.7	4.9
U.S. Real Federal Defense Spending	Billion Chained \$2009	686.3	672.0	668.8	669.5	665.3	-2.1	-0.5	0.1	-0.6
U.S. Real Exports	Billion Chained \$2009	2,118.3	2,120.6	2,112.2	2,171.2	2,262.9	0.1	-0.4	2.8	4.2
Utah Exports (NAICS, Census)	Million Dollars	12,224.3	13,307.2	14,503.8	14,059.0	13,952.1	8.9	9.0	-3.1	-0.8
Utah Coal Production	Million Tons	17.9	14.5	14.1	15.5	15.0	-19.1	-2.8	9.9	-3.2
Utah Crude Oil Production	Million Barrels	40.9	37.1	28.7	28.0	29.0	-9.3	-22.6	-2.4	3.6
Utah Natural Gas Production Sales	Billion Cubic Feet	385.5	359.0	310.0	300.0	295.0	-6.9	-13.6	-3.2	-1.7
Utah Copper Mined Production	Million Pounds	467.8	220.6	330.9	380.5	430.0	-52.8	50.0	15.0	13.0
Utah Molybdenum Production	Million Pounds	25.4	16.8	6.6	20.0	25.0	-34.0	-60.6	203.0	25.0
<b>SALES AND CONSTRUCTION</b>										
U.S. New Auto and Truck Sales	Millions	16.4	17.4	17.4	17.7	17.7	5.8	-0.2	1.9	-0.2
U.S. Housing Starts	Millions	1.0	1.1	1.2	1.3	1.5	10.7	6.1	14.0	10.7
U.S. Private Residential Investment	Billion Dollars	570.0	651.9	705.4	777.1	853.9	14.4	8.2	10.2	9.9
U.S. Nonresidential Structures	Billion Dollars	530.7	507.3	491.4	533.7	568.4	-4.4	-3.1	8.6	6.5
U.S. Home Price Index (FHFA)	1980Q1 = 100	209.5	221.3	233.0	242.5	250.2	5.6	5.3	4.1	3.2
U.S. Nontaxable & Taxable Retail Sales	Billion Dollars	5,207.6	5,327.2	5,477.1	5,698.7	5,938.1	2.3	2.8	4.0	4.2
Utah New Auto and Truck Sales	Thousands	114.7	121.9	128.4	134.2	139.6	6.3	5.4	4.5	4.0
Utah Dwelling Unit Permits	Thousands	18.7	17.5	18.5	18.0	17.5	-6.4	5.7	-2.7	-2.8
Utah Residential Permit Value	Million Dollars	3,347.7	3,824.0	3,950.0	4,100.0	4,100.0	14.2	3.3	3.8	0.0
Utah Nonresidential Permit Value	Million Dollars	1,447.2	2,041.6	2,100.0	1,700.0	1,500.0	41.1	2.9	-19.0	-11.8
Utah Additions, Alterations and Repairs	Million Dollars	1,028.2	1,053.7	1,000.0	900.0	800.0	2.5	-5.1	-10.0	-11.1
Utah Home Price Index (FHFA)	1980Q1 = 100	350.3	370.3	396.4	420.0	437.0	5.7	7.0	6.0	4.0
Utah Taxable Retail Sales	Million Dollars	26,193	27,801	29,201	30,685	32,182	6.1	5.0	5.1	4.9
Utah All Taxable Sales	Million Dollars	51,709	53,933	56,317	59,138	62,184	4.3	4.4	5.0	5.2
<b>DEMOGRAPHICS AND SENTIMENT</b>										
U.S. July 1st Population	Millions	319.5	322.0	324.5	327.1	329.8	0.8	0.8	0.8	0.8
U.S. Consumer Sentiment (U of M)	Diffusion Index	84.1	92.9	91.7	92.5	93.4	10.5	-1.3	0.9	1.0
Utah July 1st Population	Thousands	2,944.5	2,995.9	3,046.9	3,098.8	3,151.5	1.7	1.7	1.7	1.7
Utah Net Migration	Thousands	6.0	17.6	17.9	18.2	18.5				
<b>PROFITS AND RESOURCE PRICES</b>										
U.S. Corporate Before Tax Profits	Billion Dollars	2,152.1	2,088.1	2,055.0	2,157.9	2,260.0	-3.0	-1.6	5.0	4.7
U.S. Corporate Profit [above less Fed. Res.]	Billion Dollars	2,048.7	1,987.4	1,949.7	2,095.1	2,226.3	-3.0	-1.9	7.5	6.3
West Texas Intermediate Crude Oil	\$ Per Barrel	93.3	48.7	42.6	50.2	54.4	-47.8	-12.5	17.7	8.4
U.S. Coal Producer Price Index	1982 = 100	199.9	194.0	186.0	184.5	183.2	-3.0	-4.1	-0.8	-0.7
Utah Coal Prices	\$ Per Short Ton	35.6	35.0	36.0	38.0	38.0	-1.7	2.9	5.6	0.0
Utah Oil Prices	\$ Per Barrel	79.0	40.7	36.0	43.0	45.0	-48.5	-11.5	19.4	4.7
Utah Natural Gas Prices	\$ Per MCF	4.34	2.60	2.25	2.80	2.70	-40.1	-13.5	24.4	-3.6
Utah Copper Prices	\$ Per Pound	3.20	2.50	2.15	2.20	2.30	-21.9	-14.0	2.3	4.5
Utah Molybdenum Prices	\$ Per Pound	11.7	6.8	6.8	6.5	6.5	-42.0	-0.7	-3.7	0.0
<b>INFLATION AND INTEREST RATES</b>										
U.S. CPI Urban Consumers (BLS)	1982-84 = 100	236.7	237.0	240.0	245.5	250.8	0.1	1.3	2.3	2.1
U.S. GDP Chained Price Index (BEA)	2005 = 100	108.8	110.0	111.6	114.0	116.2	1.1	1.4	2.1	1.9
U.S. Federal Funds Rate (FRB)	Effective Rate	0.09	0.13	0.41	0.96	1.72				
U.S. 3-Month Treasury Bills (FRB)	Discount Rate	0.03	0.05	0.32	0.86	1.61				
U.S. 10-Year Treasury Notes (FRB)	Yield (%)	2.54	2.14	1.74	2.28	2.88				
30 Year Mortgage Rate (FHLMC)	Percent	4.17	3.85	3.59	4.11	4.85				
<b>EMPLOYMENT AND WAGES</b>										
U.S. Establishment Employment (BLS)	Millions	138.9	141.8	144.3	146.1	147.4	2.1	1.7	1.2	0.9
U.S. Average Annual Pay (BEA)	Dollars	53,810	55,381	56,479	58,581	60,943	2.9	2.0	3.7	4.0
U.S. Total Wages & Salaries (BEA)	Billion Dollars	7,476	7,855	8,150	8,558	8,983	5.1	3.8	5.0	5.0
Utah Nonagricultural Employment (DWS)	Thousands	1,328.1	1,377.7	1,427.2	1,472.1	1,509.7	3.7	3.6	3.1	2.6
Utah Average Annual Pay (DWS)	Dollars	42,187	43,522	45,039	46,197	47,254	3.2	3.5	2.6	2.3
Utah Total Nonagriculture Wages (DWS)	Million Dollars	56,026	59,962	64,279	68,007	71,340	7.0	7.2	5.8	4.9
<b>INCOME AND UNEMPLOYMENT</b>										
U.S. Personal Income (BEA)	Billion Dollars	14,810	15,459	15,988	16,712	17,528	4.4	3.4	4.5	4.9
U.S. Unemployment Rate (BLS)	Percent	6.2	5.3	4.9	4.8	4.8				
Utah Personal Income (BEA)	Million Dollars	110,844	117,764	124,510	130,912	137,628	6.2	5.7	5.1	5.1
Utah Unemployment Rate (DWS)	Percent	3.8	3.5	3.7	3.6	4.0				

Sources: State of Utah Revenue Assumptions Working Group, Moody's Economy.Com, and IHS Global Insight.