

Assessing Prior Accuracy:

The science of forecasting improves by subjecting past predictions to the test of their after-the-fact accuracy.

This year we have a new tool to do so, as the BEA provided us with this sheet:

South Carolina Board of Economic Advisors
Survey Results of Regional Advisory Committee
Summary of Economic Forecast Assumptions

Variable	Actual FY2013-14	Most Recent	Current 2/ Forecast Rates FY2014-15	Regional Advisory Committee Forecast Rates Forecast for FY2014-15					Simple Average	Olympic Scoring
				Brown	Kaglic	Sobel	von Nessen	Witte		
S.C. Personal Income 1/	3.2%	4.2%	3.75%	3.50%	3.70%	4.70%	3.90%	3.80%	3.92%	3.80%
S.C. Employment	2.1%	1.7%	1.8%	1.50%	1.80%	1.85%	1.80%	2.00%	1.79%	1.82%
Inflation Rate (CPI-U)	1.6%	1.7%	2.0%	1.90%	1.90%	2.00%	1.80%	1.10%	1.74%	1.93%
Sales Tax	2.8%	3.6%	3.0%	3.00%	3.20%	3.30%	2.90%	3.10%	3.10%	3.20%
Individual Income Tax 1/	1.9%	4.3%	3.0%	2.60%	N/A	3.65%	3.50%	2.70%	3.11%	3.58%

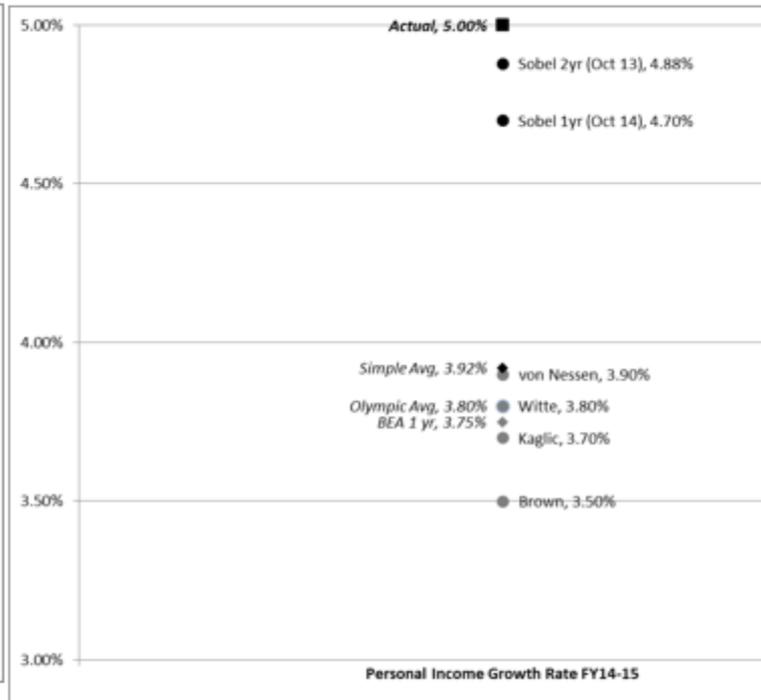
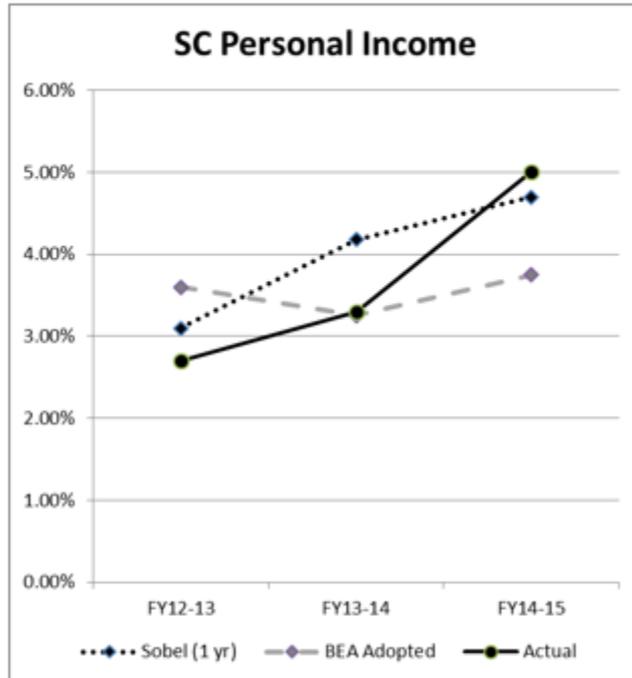
Variable	Actual FY2013-14	Most Recent	Current Forecast Rates FY2015-16	Regional Advisory Committee Forecast Rates Forecast for FY2015-16					Simple Average	Olympic Scoring
				Brown	Kaglic	Sobel	von Nessen	Witte		
S.C. Personal Income 1/	3.2%	4.2%	N/A	4.50%	3.80%	4.90%	4.10%	4.40%	4.34%	4.33%
S.C. Employment	2.1%	1.7%	N/A	1.60%	1.70%	1.70%	1.90%	1.80%	1.74%	1.67%
Inflation Rate (CPI-U)	1.6%	1.7%	N/A	2.00%	2.00%	2.15%	2.10%	2.40%	2.13%	2.08%
Sales Tax	2.8%	3.6%	N/A	3.20%	3.60%	3.45%	3.10%	3.90%	3.45%	3.42%
Individual Income Tax 1/	1.9%	4.3%	N/A	2.80%	N/A	4.00%	3.60%	4.10%	3.63%	3.80%

Assessing Prior Accuracy:

Questions:

1. We tried new methods last year, “Olympic scoring” vs. “simple average”, is there evidence one is better than the other?
2. How accurate have my own forecasts been, and is there evidence I should reconsider my forecasting methodology?

SC Personal Income Forecasts



	FY14-15
	Personal Income
Actual	5.00%
Sobel 2yr (Oct 13)	4.88%
Sobel 1yr (Oct 14)	4.70%
Simple Avg	3.92%
von Nessen	3.90%
Witte	3.80%
Olympic Avg	3.80%
BEA 1 yr	3.75%
Kaglic	3.70%
Brown	3.50%

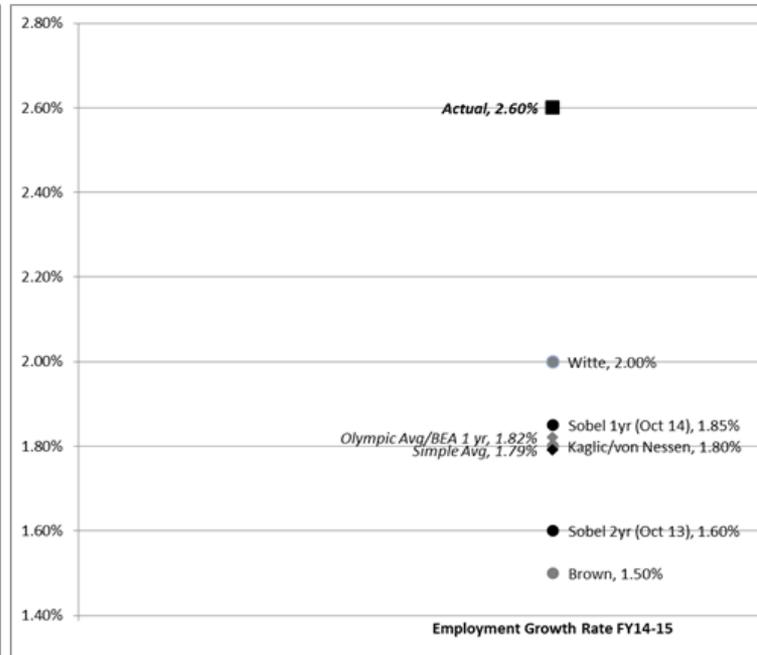
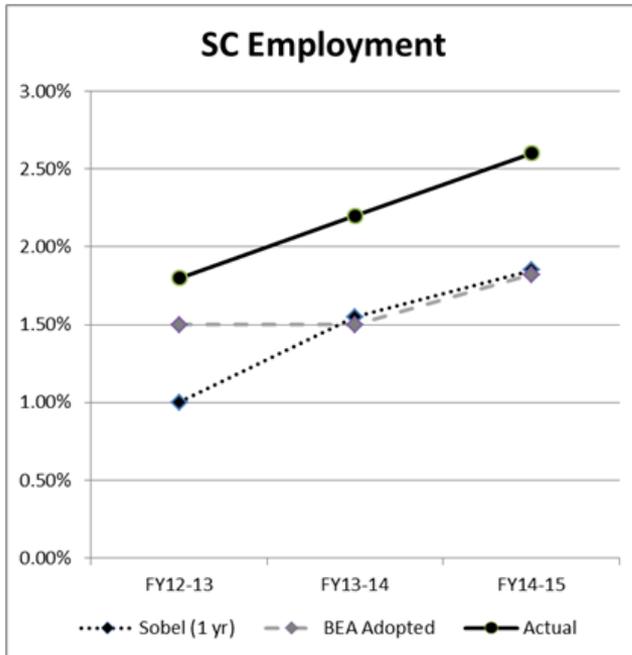
Left Pane:

1. My forecasts for FY12-13 and FY13-14 were higher than actual, but FY14-15 was almost perfect.
2. BEA (group) forecast adopted was closer to actual in FY13-14 but further away in FY12-13 and FY14-15.

Right Pane:

1. My forecasts for FY14-15, both one year out (presented at the October 2014 meeting) and two years out (presented at the October 2013 meeting) were the closest of the group.
2. The "simple average" was closer to the actual value than was the "Olympic average".

SC Employment Forecasts



	Employment
Actual	2.60%
Witte	2.00%
Sobel 1yr (Oct 14)	1.85%
Olympic Avg	1.82%
BEA 1 yr	1.82%
Kaglic	1.80%
von Nessen	1.80%
Simple Avg	1.79%
Sobel 2yr (Oct 13)	1.60%
Brown	1.50%

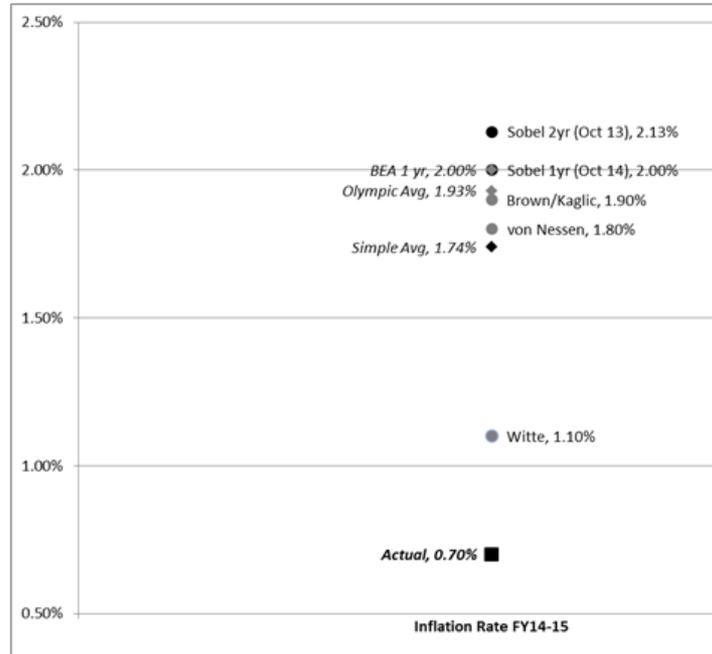
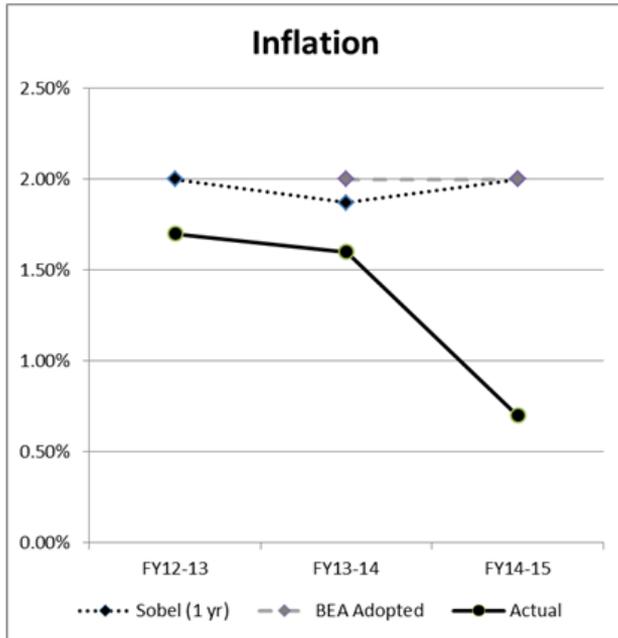
Left Pane:

1. My forecasts for all years were lower than actual.
2. BEA (group) forecast adopted was closer in FY12-13, but slightly further away in FY13-14 and FY 14-15.

Right Pane:

1. Witte's forecast was the closest, mine second, and my 1 year was more accurate than my 2 year out forecast.
2. The "Olympic average" was closer to the actual value than was the "simple average" (although they weren't much different).

Inflation Forecasts



	Inflation
Sobel 2yr (Oct 13)	2.13%
Sobel 1yr (Oct 14)	2.00%
BEA 1 yr	2.00%
Olympic Avg	1.93%
Brown/Kaglic	1.90%
Kaglic	1.90%
von Nessen	1.80%
Simple Avg	1.74%
Witte	1.10%
Actual	0.70%

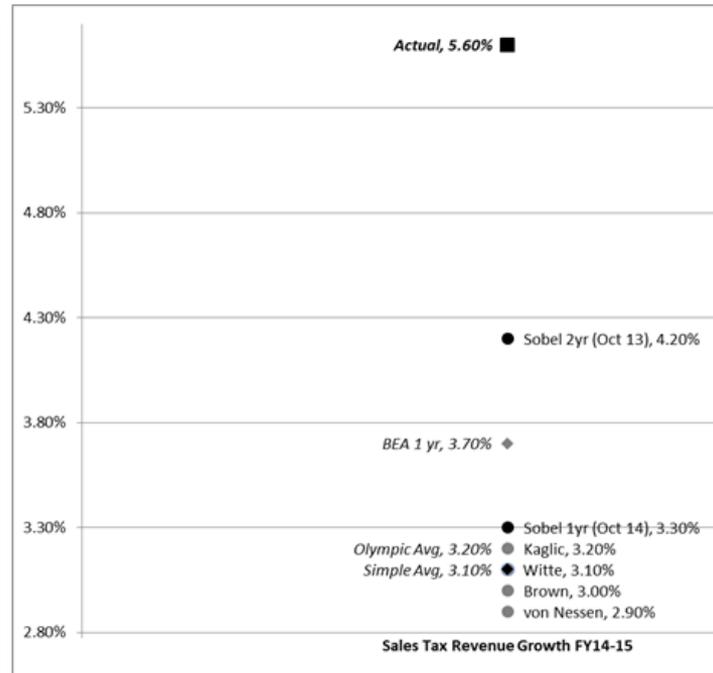
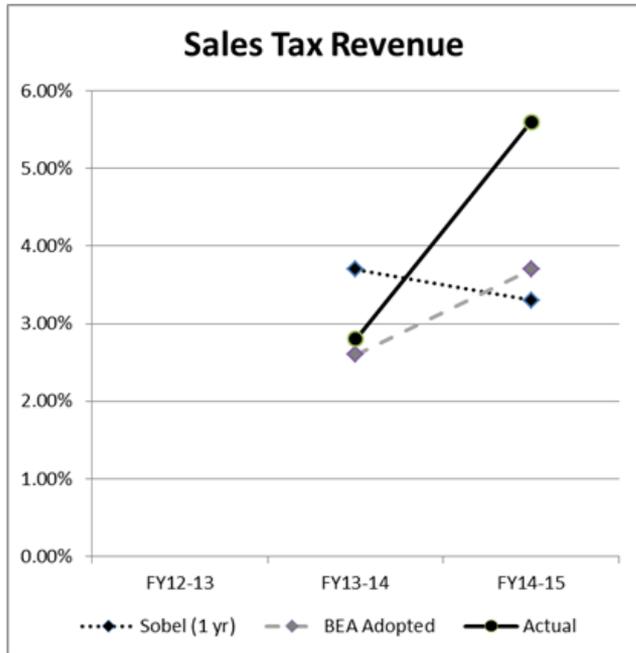
Left Pane:

1. My forecasts for all years were higher than actual.
2. BEA (group) forecast adopted (NA for FY12-13) was further away in FY13-14, same as me in FY14-15.

Right Pane:

1. Witte's forecast was again the closest, mine the worst, and my 1 year was more accurate than my 2 year out forecast.
2. The "simple average" was closer to the actual value than was the "Olympic average".

Sales Tax Revenue Forecasts



	Sales Tax
Actual	5.60%
Sobel 2yr (Oct 13)	4.20%
BEA 1 yr	3.70%
Sobel 1yr (Oct 14)	3.30%
Kaglic	3.20%
Olympic Avg	3.20%
Witte	3.10%
Simple Avg	3.10%
Brown	3.00%
von Nessen	2.90%

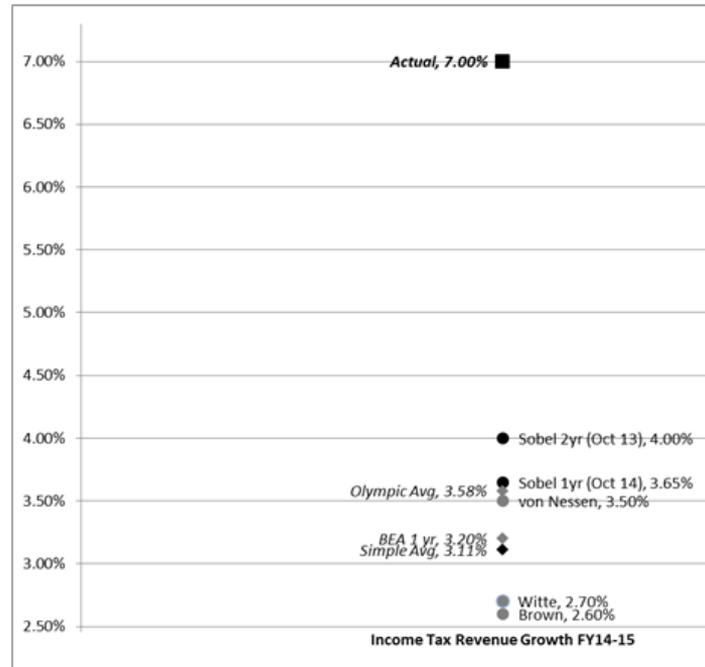
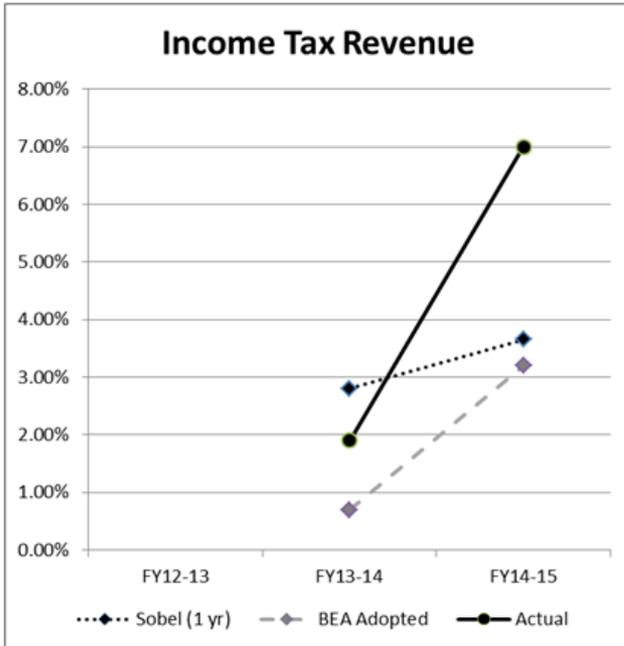
Left Pane:

1. My forecasts for one year were high, one year low. Note we only did this in past two FY, prior was a general fund revenue forecast by group.
2. BEA (group) forecast adopted was closer for both years.

Right Pane:

1. My two year out forecast was better than my one year, but my one year was still the closest of the group.
2. The "Olympic average" was closer to the actual value than was the "simple average".

Income Tax Revenue Forecasts



	Inc Tax
Actual	7.00%
Sobel 2yr (Oct 13)	4.00%
Sobel 1yr (Oct 14)	3.65%
Olympic Avg	3.58%
von Nessen	3.50%
BEA 1 yr	3.20%
Simple Avg	3.11%
Witte	2.70%
Brown	2.60%
Kaglic	N/A

Left Pane:

1. My forecasts for one year were high, one year low. Note we only did this in past two FY, prior was a general fund revenue forecast by group.
2. BEA (group) forecast adopted was worse than mine for both years.

Right Pane:

1. My two year out forecast was better than my one year, but my one year was still the closest of the group (note, Kaglic did not provide an estimate).
2. The “Olympic average” was closer to the actual value than was the “simple average”.

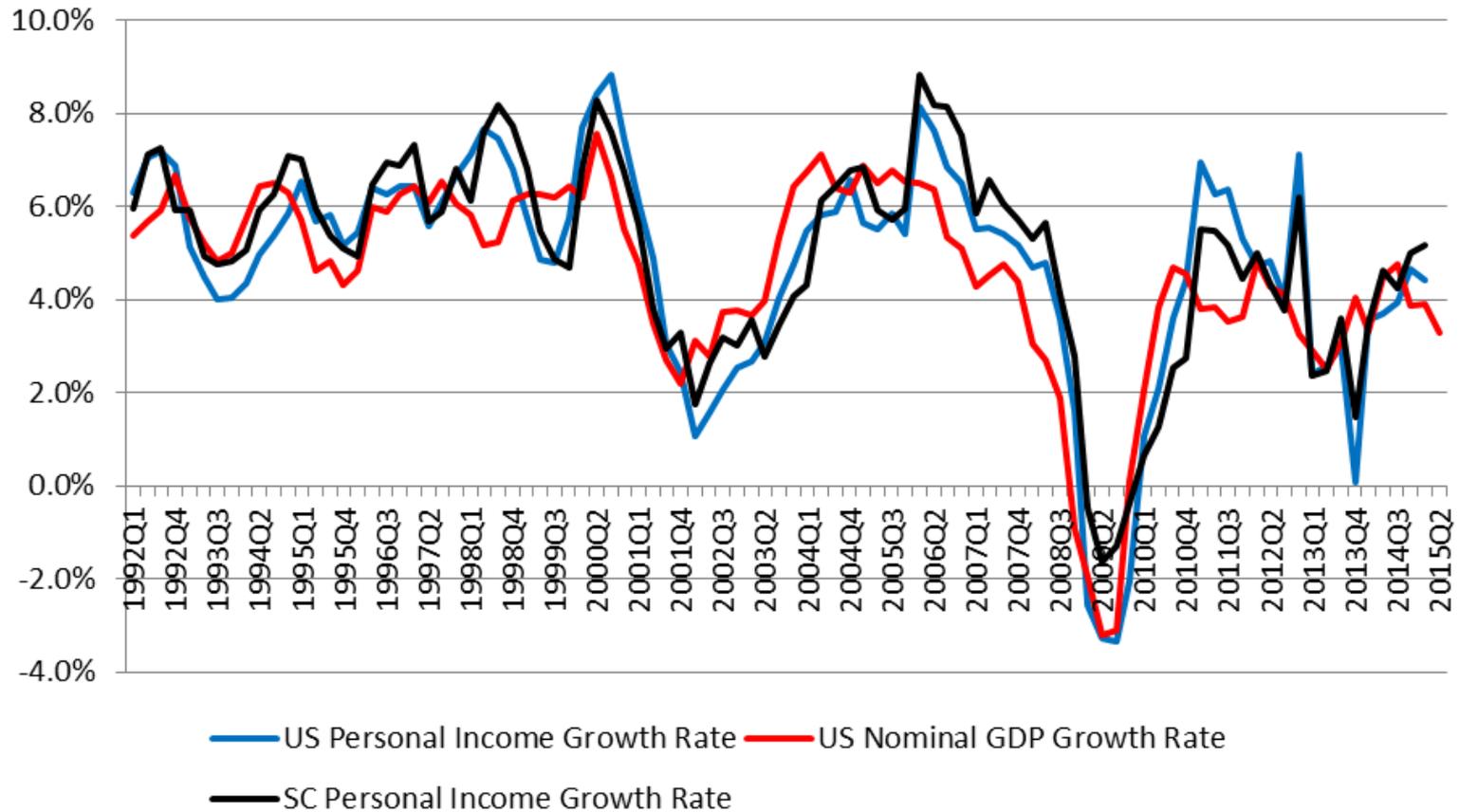
Summary of Findings from Estimates vs. Actual Examination:

Variable	Olympic vs Simple?	Closest
Personal Income	Simple	Sobel
Employment	Olympic (tie?)	Witte
Inflation	Simple	Witte
Sales Tax	Olympic	Sobel
Income Tax	Olympic	Sobel

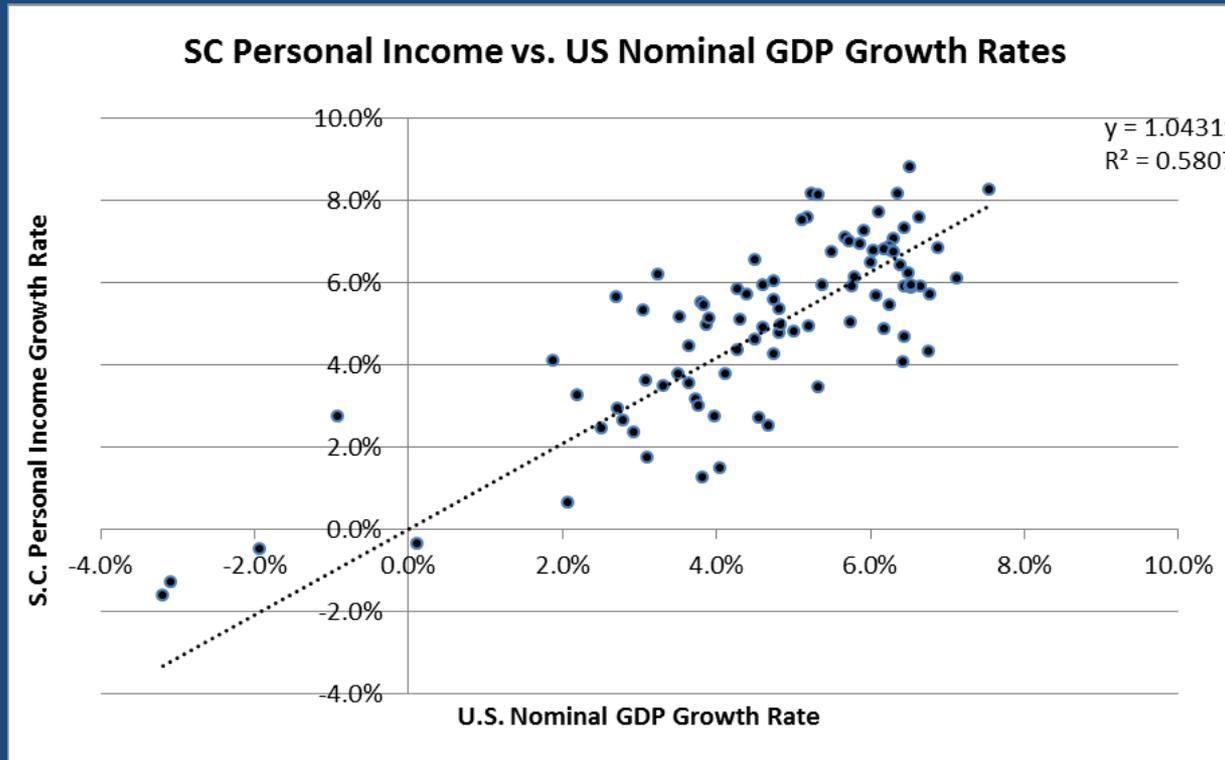
- In two cases, the Olympic average was better, in two the simple average was better, and in the other it was almost a tie. This suggests additional years of analysis will be required to set a clear winner. However, in a “moving forward” mentality, Olympic did come closer in three of the five, so I suggest we use that this year.
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- In terms of my own forecasts, I tended to systematically underestimate employment growth, and systematically overestimate inflation. However, so did all the other members and the BEA. So for now I will keep my previous methodology.

S.C. Personal Income Growth is Closely Tied to U.S. National Economy:

S.C. vs. U.S. Economic Growth Rates



S.C. Personal Income Growth is Closely Tied to U.S. National Economy:



The elasticity of S.C. Personal Income with Respect to U.S. Nominal GDP over the long term is not significantly different from 1.0 using quarterly data (converted to annual changes vs. 4 quarters ago), from 1992 Q1 to present. I therefore assume that:

S.C. Personal Income Growth Rate \approx U.S. Nominal GDP Growth Rate

Summary of Major Economic Forecasts:

1. IMF World Economic Outlook (July 9, 2015 Update and April 2015 original)¹

	<i>World Output Growth</i>	<i>U.S. Real GDP Growth</i>	<i>U.S. Inflation</i>	<i>U.S. Nominal GDP</i>
2015:	3.3%	2.5%	0.5%	3.0%
2016:	3.8%	3.0%	1.5%	4.5%
<i>Long Term (through 2020) for inflation only:</i>			2.15%	

<p>Averaging these two gives 1.0% for FY2015-16</p>
<p>Long term for FY2016-17 between 1.5 and 2.15 (so 1.8%)</p>

<p>Averaging these two gives 3.75% for FY2015-16, and implies 4.5% for end of 2016 (beginning of FY2016-2017)</p>

Summary of Major Economic Forecasts:

2. Federal Reserve Bank of Philadelphia's Livingston Survey (June 2015)²

	<i>U.S. Real GDP Growth Rate</i>	<i>U.S. Nominal GDP Growth Rate</i>	
2015Q2 to 2015Q4:	3.1%	4.8%	} 2015Q3 to 2016Q2 is FY2015-2016 , the average of these two is 4.9%
2015Q4 to 2016Q2:	2.9%	5.0%	
Annual 2014 to 2015:	2.2%	3.2%	} FY2016-2017 , average 4.8%
Annual 2015 to 2016:	2.9%	4.8%	
Long Term (Next 10 Years):	2.5%	4.8%	
 <i>Unemployment Rate</i>			
	December 2015: 5.1%		
	June 2016: 5.0%		
	Annual 2014 to 2015: 5.3%		
	Annual 2015 to 2016: 5.0%		
 <i>CPI Inflation Rate</i>			
	June 2015 to Dec 2015: 2.2%	} June 2015 to June 2016 is roughly FY2015-2016 , the average of these two is 2.1%	
	Dec 2015 to June 2016: 2.0%		
	Annual 2014 to 2015: 0.1%	} Looking out into FY2016-2017 , inflation average 2.15%	
	Annual 2015 to 2016: 2.1%		
	Long Term (Next 10 Years): 2.2%		

Summary of Major Economic Forecasts:

3. Survey of Professional Forecasters (Third Quarter 2015 released August 14, 2015)³

	<i>Real GDP%</i>	<i>Nominal GDP%</i>		<i>Unemployment Rate</i>		<i>Employment Growth%</i>
Quarterly data:						
2015:Q3	2.7%	4.4%	} 2015Q3 to 2016Q2 is FY2015-2016 , the average of these four is 4.625%, FY2016-17 begins 4.7% for 2016Q3	5.3%	} 2015Q3 to 2016Q2 is FY2015-2016 , the average of these four is 1.75%, and then 1.6% beginning FY2016-17	1.9%
2015:Q4	2.8%	4.4%		5.1%		1.9%
2016:Q1	2.8%	4.7%		5.1%		1.6%
2016:Q2	2.8%	5.0%		5.0%		1.6%
2016:Q3	2.7%	4.7%		4.9%		1.6%
Annual data (based on annual average levels):						
2015	2.3%	3.4%		5.3%		2.1%
2016	2.8%	4.6%		5.0%		1.7%
<u>2017</u>	<u>2.6%</u>	<u>N.A.</u>		4.8%		N.A.
<u>2018</u>	<u>2.4%</u>	<u>N.A.</u>		4.7%		N.A.

Probability of Negative Real GDP Growth by Quarter:

2015:Q3	7.5%
2015:Q4	10.0%
2016:Q1	13.7%
2016:Q2	13.0%
2016:Q3	13.6%

The chance of a negative quarter of GDP growth during FY2015-16 (2015Q3 to 2016Q2) averages 11.05%, and the probability grows as we move toward first quarter of FY2016-17 – **HIGHER THAN A YEAR AGO**

Summary of Major Economic Forecasts:

3. Survey of Professional Forecasters (Third Quarter 2015 released August 14, 2015)³

U.S. Inflation Rate (CPI):

Quarterly Data

2015:Q3	2.0%
2015:Q4	1.8%
2016:Q1	2.0%
2016:Q2	2.2%
2016:Q3	2.2%

2015Q3 to 2016Q2 is **FY2015-2016**, the average of these four is 2.0%

Q4/Q4 Annual Averages

2015	0.8%
2016	2.1%
2017	2.3%

2016Q3 into 2017 is **FY2016-2017**, the average of these two is 2.25%

Long-Term Annual Averages

2015-19	2.0%
2015-24	2.15%

Summary of Forecast Data:

Summary of Forecast Data:

Economic Estimates:

	FY 2015-2016			FY 2016-2017		
	SC Personal Income Growth (=US Nominal GDP Growth)	CPI Inflation Rate	Employment Growth	SC Personal Income Growth (=US Nominal GDP Growth)	CPI Inflation Rate	Employment Growth
International Monetary Fund	3.75%	1.0%		4.5%	1.8% (1.5-2.15%)	
Livingston Survey	4.9%	2.1%		4.8%	2.15%	
Survey of Professional Forecasters	4.625%	2.0%	1.75%	4.7%	2.25%	1.6%
Average	4.425%	1.7%	1.75%	4.67%	2.07%	1.6%
Median	4.625%	2.0%	1.75%	4.7%	2.15%	1.6%

Summary of Forecast Data:

Revenue Estimates:

	FY2015-2016	FY2016-2017
Sales Tax Revenue	3.3% (3.2%-3.4%)	3.4%
Individual Income Tax Revenue	3.4% (3.2%-3.6%)	3.7%
General Revenue	5.65% (5.6%-5.7%)	5.7%

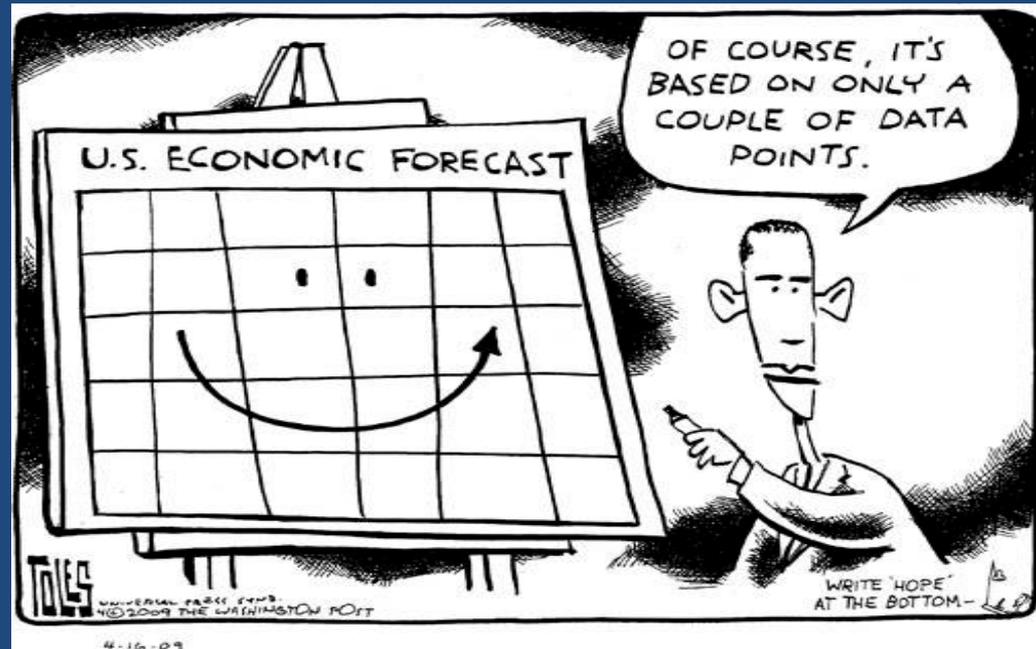
Using estimated elasticities per Sobel & Holcombe (1996) method.

Forecast Table:

What is your forecast growth rate for the following variables:

Variable	Actual FY2014-15	Most Recent	Current 1/ Forecast Rates FY2015-16	Forecast FY2015-16	Forecast FY2016-17
S.C. Personal Income	5.0%	4.4%	4.30%	4.63%	4.7%
S.C. Employment	2.6%	2.8%	---	1.75%	1.6%
Inflation Rate (CPI-U)	0.7%	0.0%	2.0%	2.0%	2.15%
Sales Tax (Y-T-D)	5.6%	6.6%	4.3%	3.3%	3.4%
Individual Income Tax (Y-T-D)	7.0%	6.8%	4.6%	3.4%	3.7%

Caveats:



- Given the uncertainty present in the current economy, and the significantly increasing risks of a negative quarter of Real GDP growth, I again ***strongly urge S.C. state government to continue to build & maintain sufficient reserves to handle another economic downturn.***
- Also my forecasts do not take into account any effects of the October 2015 flooding in S.C. and may need to be adjusted accordingly.