

Using Demographic Data to Inform Long-Term Budget Projections

The 2012 Pennsylvania Data User Conference

Matthew Knittel

Director, Independent Fiscal Office

September 20, 2012



Disclaimer: The Independent Fiscal Office does not support or oppose any existing or proposed tax or budget policies. Consistent with its mission, the office will not make any policy recommendations.

Today's Presentation



- Start with some background.
 - Brief introduction to Independent Fiscal Office.
 - Types of projections we do: short vs. long run.
- Question: How do we ensure that demographics accurately reflected in the economic forecasts (output, incomes, employment)?
 - What is the outlook for PA?
- Why Do We Care?: Demographics and economic forecasts directly impact projections of expenditures and tax revenues.

Independent Fiscal Office



- Established Sept. 2011. Plays a role similar to Congressional Budget Office.
 - Long and short-term budget projections.
 - Special studies as requested by General Assembly. Currently looking at property tax reform proposal.
 - “Scoring” of changes to tax code: impact on tax revenues (+/-).
 - Website: ifo.state.pa.us.

Two Budget Projections



- **Official Revenue Estimate** due June 15.
 - Project General Fund, Lottery Fund, Transportation and Federal Funds for next FY.
 - Use macroeconomic forecast provided by IHS Global Insight. Economic growth rates.

- **Five-Year Outlook** due November 15.
 - Projection of same funds, but expenditures too.
 - Projections five years past current FY.
 - We assume economy reaches its full potential in “long run.” Look to demographics to inform.

Five-Year Outlook Report



- Idea is to examine fiscal sustainability and any structural budget issues.
 - Once economy reverts to “normal,” does spending = revenues?
 - Is there a structural deficit or surplus? If so, what is the root cause(s)?
 - Are there long-term issues policymakers should be aware of when crafting policy?
 - Analysis assumes a “current services” and “current policy” baseline. Same levels of service per capita. No change in tax laws.
 - ONLY demographics and economics change.

Demographics are Key



- For long-term projections of economy, spending and revenues, demographics are a primary driver. For example:
 - Education: 6-18 age cohort.
 - Medical Assistance: over 65 cohort.
 - Economy: labor force drives potential output.
 - Sales Taxes: composition of population determines spending patterns.
 - Personal Income Tax: Pensions and Social Security are non-taxable.
 - Other: Student Loan Debt.

First, Some Conventions



- Over long-run, we assume the economy grows at its “potential.”
 - The long-term trend growth of the economy once we control for shocks, such as recessions or booms.
 - No underutilized capacity and “full employment.”
- What are the implications of those assumptions?
 - The economy and employment levels grow at rates that do not raise or lower inflationary pressures.
 - Consistent with NAIRU (non-accelerating inflationary rate of unemployment).
 - Potential Output is NOT a technical limit, it is just the sustainable limit in long-run.

Some Caveats

- Methodology based on Congressional Budget Office.
- This “growth accounting” approach typically used to project U.S. economy.
 - Less applicable to sub-national economy such as a state.
 - However, the data suggest that some simple modeling techniques might work well for state level forecast.
 - Strength: very transparent. Easy to trace implications of demographics for long run economic trends.
- Modeling is very simplistic.
 - Not necessarily a weakness.

What Drives Economic Growth?

- Three factors are relevant:
 - Size of Labor Force.
 - Stock of Capital (value of equipment, machines).
 - Productivity of both “factors” (per capita output).
 - But, how to measure capital stock and its productivity?
- Solution: simplify the problem further.
 - Consider only Labor Force and Labor Productivity.
 - Over long run, assume that growth in Potential Output = Actual Output.
 - Economic Growth = Growth Labor Force * Growth Labor Productivity.

Key Assumptions in CBO's Projection of Potential GDP

	Average Annual Growth Rates					
	1950 - <u>1973</u>	1973 - <u>1981</u>	1982 - <u>1990</u>	1991 - <u>2001</u>	2002 - <u>2011</u>	1950 - <u>2011</u>
<u>Historicals</u>						
Actual GDP (real)	4.0	2.9	4.0	3.5	1.6	3.2
Potential GDP (real)	3.9	3.2	3.1	3.1	2.3	3.3
Labor Force	1.6	2.5	1.6	1.2	0.8	1.5
Labor Productivity	2.3	0.7	1.5	1.9	1.4	1.8
<u>Projections</u>	2012 - <u>2017</u>	2018 - <u>2022</u>	2012 - <u>2022</u>			
Actual GDP (real)	3.4	2.5	3.0			
Potential GDP (real)	2.2	2.5	2.3			
Labor Force	0.7	0.7	0.7 <i>demographics</i>			
Labor Productivity	1.5	1.8	1.7 <i>reverts to long run average</i>			

Data for Pennsylvania's Potential Labor Force

<u>Age Cohort</u>	<u>Annual Average Growth Rate</u>		
	<u>1990 to 2000</u>	<u>2000 to 2010</u>	<u>2010 to 2020</u>
Under 20	0.3%	-0.5%	-0.1%
20-64	0.3%	0.6%	-0.3%
Over 65	0.5%	0.2%	2.1%
Over 85	3.4%	3.6%	0.7%
Total	0.3%	0.2%	0.2%

Potential Output for Pennsylvania Economy

	Annual Average Growth Rate			
	1990 to <u>2000</u>	2000 to <u>2012</u>	1990 to <u>2012</u>	2012 to <u>2022</u>
Actual GSP (real)	2.2%	1.0%	1.5%	????
Labor Force	0.3%	0.6%	0.4%	0.0%
Labor Productivity	1.9%	0.4%	1.1%	1.1%

Note: Labor Force Productivity determined by actual labor force and real GSP.

Comparison of U.S. and Pennsylvania Real Economic Growth

	Average Annual Growth Rate			
	1990 to <u>2000</u>	2000 to <u>2012</u>	1990 to 2012	2012 to <u>2017</u>
Pennsylvania				
Real GSP (real)	2.2%	1.0%	1.5%	???
Labor Force	0.3%	0.6%	0.4%	0.0%
Labor Productivity	1.9%	0.4%	1.1%	1.1%
United States				
Actual GDP (real)	1991 to <u>2001</u>	2002 to <u>2011</u>	1950 to <u>2011</u>	2012 to <u>2017</u>
Potential GDP (real)	3.5%	1.6%	3.2%	3.4%
Labor Force	3.1%	2.3%	3.3%	2.2%
Labor Productivity	1.2%	0.8%	1.5%	0.7%
	1.9%	1.4%	1.8%	1.5%

Some Questions

- How will PA return to economic “potential”?
 - OR: when is “full employment” achieved?
 - What does that path look like?

- If U.S. returns to a “natural” unemployment rate, does PA?
 - We assume it does. PA rate appears slightly lower than U.S.
 - We can compute implicit increase in employment levels necessary to achieve that.
 - Therefore, we get an extra economic “kick” as unemployed return to work.

Some Questions

- Why lower PA productivity?
 - PA workforce disproportionately in health care and education sectors.
 - More difficult to register productivity gains since they are relatively labor intensive.

- But what about labor participation rates? Could they increase?
 - Unclear. But, rates must increase to boost output given current demographic trends.

Annual Average PA Labor Force Participation Rates

Center for Workforce Information & Analysis

July 19, 2012

Year	Total	Age Groups (both genders)					
		16-19	20-24	25-44	45-54	55-64	65+
1997	64.5	54.1	75.4	84.7	82.7	59.6	10.2
1998	64.0	52.3	75.5	84.6	82.0	58.8	10.0
1999	64.4	51.9	76.1	84.6	83.0	60.2	10.5
2000	64.3	52.8	76.5	84.3	83.8	59.9	10.9
2001	65.3	51.2	75.3	85.3	83.7	60.7	12.0
2002	65.7	51.6	77.3	84.9	83.7	62.9	12.6
2003	63.9	46.7	74.2	83.4	82.8	63.4	13.1
2004	64.5	48.8	73.9	84.3	82.7	63.3	13.0
2005	64.4	46.0	74.9	83.6	83.1	65.2	12.4
2006	64.4	45.2	73.3	84.3	82.2	64.8	14.4
2007	64.5	45.3	74.0	83.2	83.2	62.6	15.7
2008	65.3	47.2	75.7	84.3	84.3	64.7	16.3
2009	64.3	44.4	74.3	84.0	82.5	66.1	16.7
2010	63.2	40.7	70.6	83.6	81.9	65.4	16.5
2011	63.2	45.3	72.3	82.9	80.1	64.1	16.1

Extending the Analysis (1)

- Having determined real growth of the economy, other forecasts can be determined and ensure consistency.
 - Growth of workforce is determined by (1) return to natural rate of unemployment and (2) demographics.
 - Add inflation to get “nominal” amounts. Largely determined in long run by national conditions. Use national forecast, roughly 2% (Federal Reserve target rate).
 - Assume growth in total output = growth total income. (Should hold generally.)

Extending Analysis (2)

- Having determined income growth, share out to factors of production: wages, business income, rents.
- Add on other items: transfer income (social security), pensions, UC, other.
 - Also driven by demographics
- Allows demographics to motivate long run projections. A reasonable forecast of likely outcomes if economy returns to “potential.”
- Other forecasts typically “share down” a national forecast and ignores state specific demographics.

Does the Growth Economy (Output) = Growth Income?						
				Average Annual Growth Rate		
				1990 to	2000 to	1990 to
				<u>2000</u>	<u>2012</u>	<u>2012</u>
Pennsylvania						
Real GSP				2.2%	1.0%	1.5%
CPI-U Philly				2.6%	2.7%	2.7%
Nominal GSP				4.7%	3.8%	4.1%
Nominal Personal Income				4.8%	3.7%	4.1%
				1991 to	2002 to	1950 to
				<u>2001</u>	<u>2011</u>	<u>2011</u>
United States						
Real GDP				3.5%	1.6%	3.2%
GDP Deflator				2.1%	2.3%	3.4%
Nominal GDP				5.8%	3.9%	6.6%
Nominal National Income				5.8%	4.0%	6.7%
						2012 to
						<u>2022</u>
						3.0%
						1.8%
						4.8%
						na

Macro Forecasting Made Simple

1. Demographics determine Labor Force growth.
2. Allow economy to return to “potential” with full employment.
3. Determines employment levels.
4. Assume future Labor Productivity growth “normal.” Yields growth Real Output (GDP).
5. Add a national inflation forecast (roughly 2%).
6. Assume growth Nominal Output = growth Nominal Income (known as personal income).
“Share it out” to wages, profits, rents, dividends.
Add transfer income based on demographics.

Other Demographic Effects



- Some long-term tax base erosion issues also tied to demographic trends.
 - Retirees spend lower share of income on taxable goods (cars, furniture).
 - Retiree income generally non-taxable: social security, pensions.
 - New Graduates: Debt levels at all time highs. Less disposable income. For Q4 2011, data show average balance of \$23,000. Median is \$12,800. Loan payments currently limited to 10% of income after 2013. Cannot discharge debt through bankruptcy.

Conclusions

- Demographics suggest relatively slow growth for PA economy.
 - **Crucial:** Labor force participation rates.

- Some tax base erosion issues. Additional challenges on spending side.

- Simple macro modeling is instructive. Can be used to inform long-run projections as economy returns to potential.
 - Is it a better forecast? Unclear. But we ensure consistency.