Inflation, the NAIRU, Potential Output and Productivity Growth During the Slow Recovery

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The Many Puzzles of the Slow 2009-13 Recovery

• Actual real GDP growth since 2009:Q4 = 2.1
• In 2007 consensus forecast of potential GDP was 2.5
• Therefore, according to Okun’s Law, with actual output growth slower than potential, the unemployment rate should have increased over the past 4 years.
• But it fell from 10.0 to 7.3. Why?
Understanding Okun’s Law Requires the Output Identity

\[ Y^P \equiv \frac{Y^P}{H^P} \cdot \frac{H^P}{E^P} \cdot \frac{E^P}{E^H} \cdot \frac{E^H}{L} \cdot \frac{L}{N} \cdot N \]

\[ Y^I \equiv \frac{Y^I}{H^H} \cdot \frac{H^H}{E^H} \cdot \frac{E^H}{L} \cdot \frac{L}{N} \cdot N \]
Okun’s Law Predicts Regular Responses of the Right Side to Cycles in the Output Gap

• This recovery is different because E/L has risen despite slow real GDP growth
• Everyone understands one reason: the labor force participation rate (L/N) fell from 64.9 in 2009:Q4 to 63.4 in 2013:Q2
• Baby-boom retirement, dropping out of young men and prime-age men
• End of postwar rise in female L/N
The Less Obvious Reason

• The slower is productivity growth, the faster the growth of aggregate hours of work must be.

• Consensus estimates of growth of trend productivity for the total economy are at 1.6 to 1.7.

• Yet actual growth per year of total economy productivity growth since 2009:Q4 is 0.5
How Can We Disentangle Actual from Trend Growth in Output and Productivity?

• What we need is an outside indicator of the business cycle.

• This allows the computer to look at the history of a variable like productivity and say – these are the fluctuations related to the business cycle. The rest is the underlying trend.
Where Does This Magical Outside Cyclical Indicator Come From?

• The answer is to use the inflation process to determine the NAIRU (Non-Accelerating Inflation Rate of Unemployment)

• When inflation accelerates, then unemployment is too low, and vice versa.

• The correct inflation model can extract the natural rate of unemployment or NAIRU, and hence the unemployment gap.

• Then we feed that into a detrending program to separate trend and cycle of output and productivity
Four Quarter Changes in Headline Inflation Rate vs Total Unemployment Rate, 1962:Q1 to 2013:Q1
Big Problem: Inflation Has No Simple Relationship to Unemployment

- All this has been well-known since 1975 although mainly forgotten by academic economists.
- You can’t understand the U.S. inflation process without including in the inflation equation explicit variables to account for supply shocks – the relative price of food, energy, imports, the impact of changing trend productivity growth, and Nixon price-control dummies.
- I’ve recently revived my 1982 “triangle model” specification which did all that.
- See NBER WP 19390, which went public last Monday at the NBER web site, “The Phillips Curve is Alive and Well.”
Academic Economics Has Gone Backwards with the NKPC

• Supply shocks have been forgotten
• Reduced form of NKPC involves nothing more than regression inflation on a few lags of inflation and the unemployment rate.
• This approach doesn’t have a clue about inflation behavior in the 1970s or late 1990s
• Diagnostic tool: the “dynamic simulation” uses fitted coefficients only through 1996, values of explanatory variables after 1996 EXCEPT FOR LAGGED INFLATION (generated endogenously 1997-2013).
Actual vs Simulated Headline Inflation Rate, 1996:Q4 Sample End, NKPC vs Triangle Model, 1987:Q1 to 2013:Q1
Total, Short Run, and Long Run Unemployment Rate, 1960:Q1 to 2013:Q1

- Total Unemployment Rate
- Short Run Unemployment Rate
- Long Run Unemployment Rate

Year:
- 1960
- 1965
- 1970
- 1975
- 1980
- 1985
- 1990
- 1995
- 2000
- 2005
- 2010

Percent:
- 0
- 2
- 4
- 6
- 8
- 10
- 12
Actual vs Simulated Headline Inflation Rate, 1996:Q4 Sample End, Total vs Short Run Unemployment Rate, 1987:Q1 to 2013:Q1
Total, Short Run, and Implied Long Run NAIRU, 1961:Q1 to 2013:Q1

- Total NAIRU
- Short Run NAIRU
- Implied Long Run NAIRU

Year


Percent

0 1 2 3 4 5 6 7

Graph showing the trend of Total, Short Run, and Implied Long Run NAIRU from 1961 to 2013.
Triangle Model Headline Inflation Rate Projections, 2013:Q1 Sample End, Total vs Short Run Unemployment Rate, 1987:Q1 to 2023:Q1

Actual Inflation Rate

Fitted

Simulated

Short Run Unemployment Rate
Inflation Rate Projection

Total
Unemployment Rate
Inflation Rate Projection

Percent per Year

Year

Triangle Model Headline Inflation Rate Projections without Projected Decline in Unemployment Rate, 2013:Q1 Sample End, Total vs Short Run Unemployment Rate, 1987:Q1 to 2023:Q1
Now We’re Ready to See What These Two Alternative Unemployment Gaps Imply

- We have quarterly data on real GDP, hours of work, and output per hour.
- We ask the computer, using the outside unemployment gap estimate, to separate actual data into trends and deviations from trend.
- The charts you’ll see are the averages of the two alternative gap series (2013 NAIRU of 6.5 vs. 5.0).
- They also average the GDP and GDI (which are conceptually identical) and hours of work from the payroll and household surveys.
- Nobody has ever done this before.
Annualized Trend Growth of Labor Productivity, Hours, and Output, Average Identity, Average of Estimated and Arbitrary NAIRU Trends, 1955:Q1 - 2013:Q1
Labor Productivity, Hours, and Output Gap, Average Identity, Average of Estimated and Arbitrary NAIRU Trends, 1955:Q1 - 2013:Q1
Startling Implications

• Compared to 2007-era estimates of 2.5 percent potential output growth (CBO today clings), central estimate for 2013 is a mere 1.5 percent.
• Compared to 2007-era estimates of 2 percent productivity growth, the central estimate for 2013 is a mere 1.2 percent.
• Monetary policy: The Fed has far less room to maneuver than generally thought.
• Fiscal policy: Future potential output growth will be slower than CBO so debt/GDP will rise faster.
Seque to Long-run Growth Debate with Erik

• One year ago, I produced the NBER WP “Is U.S. Economic Growth Over?”

• Compared to historical 1891-2007 growth in productivity of 2.2, I forecast 1.3 for next 25 to 40 years

• Compared to historical growth in output per capita of 2.0, I forecast 0.9 for the next 25 to 40 years

• Compared to the 0.9 for the average, I forecast only 0.4 for the bottom 99%, and only 0.2% for disposable income
Today’s Conclusion: The Future Has Already Arrived!

• Current trend of productivity is 1.2, compared to my gloomy future forecast of 1.3.

• Output per capita trend is 1.5 – 0.8 population growth = 0.7, below my gloomy future forecast of 0.9.

• Hours growth trend is 0.5 slower than population growth, compared to my future forecast of 0.4 slower.
My Long-Run Growth Forecast Does Not Require the End of Innovation

• My 1.3 productivity forecast is the actual rate of 1.55 for 1972-2012 shifted downward to 1.3 because of stagnating educational achievement.

• The big decline in the impact of innovation on productivity happened 40 years ago (1891-1972 = 2.35, 1972-2012 = 1.55).

• To match the achievements of the past 40 years over the next 40 will be a stunning achievement.