E, and Ultimately FE:
The Case for Secular Stagnation

David G. Tucek
Value Economics, LLC
david.tucek@valueeconomics.com
314 434 8633
http://www.valueeconomics.com

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The Plan

Â Quickly look at some data.
Â Look at alternative explanations of the data.
Â Look at some more data.
Â Why is it ultimately FE?

(No discussion of policy, as interesting as that might be.)
Typical Recession/Recovery Comparison

Growth in Total Nonfarm Employment During Recessions
(Month Prior to Recession’s Start = 100)
Average of 1st Eight Recessions Compared to Last Four

Growth in Total Nonfarm Employment During Recessions
(Month Prior to Recession’s Start = 100)
Decline and Recovery in Total Nonfarm Employment During Recessions
(Month Prior to Recession’s Start = 100)

<table>
<thead>
<tr>
<th>Base Month</th>
<th>Decline from Start to Trough</th>
<th>Months to Employment Recovery</th>
<th>Recession Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>January-1945</td>
<td>-8.11%</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>October-1948</td>
<td>-5.08%</td>
<td>21</td>
<td>11</td>
</tr>
<tr>
<td>June-1953</td>
<td>-3.36%</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>July-1957</td>
<td>-4.16%</td>
<td>21</td>
<td>8</td>
</tr>
<tr>
<td>March-1960</td>
<td>-1.66%</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>November-1969</td>
<td>-0.95%</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>October-1973</td>
<td>-1.48%</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>December-1979</td>
<td>-0.92%</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>June-1981</td>
<td>-2.97%</td>
<td>28</td>
<td>16</td>
</tr>
<tr>
<td>June-1990</td>
<td>-1.48%</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td>February-2001</td>
<td>-1.97%</td>
<td>48</td>
<td>8</td>
</tr>
<tr>
<td>November-2007</td>
<td>-6.22%</td>
<td>77</td>
<td>18</td>
</tr>
</tbody>
</table>
Trendline Growth In Nonfarm Employment During Economic Expansions

Ignore? First of Carter/Volcker double dip.
Trendline Growth in Real GDP During Economic Expansions

Ignore? First of Carter/Volcker double dip.
Trendline Growth in Real GDP per Capita During Economic Expansions

Ignore? First of Carter/Volcker double dip.
Trendline Growth in Real GDP per Working Age Person During Economic Expansions

Working Age Pop = 15 to 64

Ignore? First of Carter/Volcker double dip.
Real GDP Compared to Potential Output

Quarterly Data - 2009 $s

Post 2014 Growth
CBO Jan 2007 View  2.55%
CBO Jan 2015 View  2.19%
Output Gap as a Percent of Potential GDP
Something Has Changed

Â Last 4 recessions
   ï Longer recovery period for employment.

Â Last 4 expansions
   ï Slower growth in employment and real GDP.
Something Has Changed

Å Last 4 recessions
  ï Longer recovery period for employment.

Å Last 4 expansions
  ï Slower growth in employment and real GDP.

Å Last 2 recessions and expansions
  ï Same as above, but even more so.
  ï Plus slower growth in real GDP per capita and per working age person.
Something Has Changed

Â The Great Recession and Not-So-Great Recovery
- Sharp drop in potential real GDP.
- Output gap still at 2 percent.
- Similar to the Volcker/Carter double-dip in depth.
- 77 months until employment recovered.
Something Has Changed

Is it Cyclical or Secular?
God may have created man before woman, but there is always a rough draft before the masterpiece.
It is Cyclical

Proponents focus attention on what caused the Great Recession and/or on why the subsequent recovery has been so anemic.
It is Cyclical: John Taylor

- Monetary policy that was too loose starting in 2003 (the Great Deviation).
- Affordable housing mandate for Fannie Mae and Freddie Mac.
- Housing boom followed by bust and defaults.

Uncertainty caused by

- Ad hoc bailout decisions (Bear Stearns but not Lehman).
- Changes in the rollout of TARP (Troubled Asset Relief Program).
- Unwinding of the massive Fed balance sheet build up (QE I, II and III).
- Delay in the implementation of Dodd-Frank.

Temporary stimulus measures (2008 stimulus package; Cash for Clunkers).
It is Cyclical: Richard Koo

Â Great Recession was a balance-sheet recession.

Â Firms and households not interested in additional borrowing to finance spending or investment, even at very low interest rates.

Â This is rationale for the individual players, but in the aggregate it leads to reduced demand, a deeper recession and a slower recovery.

Â Monetary policy will be ineffective î requires sustained fiscal stimulus.
It is Secular

Proponents focus on factors that have impacted potential GDP or that have caused GDP to remain well below its potential.
It is Secular: Robert Gordon

Â Per capita U.S. real GDP growth will decline from the 2.0 percent experienced from 1891 to 2007, to only 0.8 percent over the next 70 years.

Â Suggests "secular stagnation" is a permanent, or at least persistent, decline in the growth of potential output.

Â Four major headwinds:
   1. Demography: end of "demographic dividend" and retirement of baby boomers.
   2. A plateau in educational attainment in the U.S.
   3. Rising income inequality.
   4. The increasing burden of federal, state and local government debt.
It is Secular: Robert Gordon

Additional headwinds:
- Impact of globalization on both employment levels and earnings.
- Cost of environmental policy.
- High cost of medical care in the U.S.

Only assumes that pace of technological innovation since 1972 will be sustained, not that technological progress will cease.
It is Secular: Larry Summers

Â The supply of savings has increased while at the same time the investment schedule (i.e., the demand for savings) has decreased.

Â Full-employment required interest rate (FERIR) is negative.

Â Due to zero lower bound on nominal interest rates and a low-inflation environment, the negative FERIR and full employment cannot be attained.

Â Suggests "secular stagnation" is a permanent, or at least persistent, shortfall in actual versus potential output.
It is Secular: Larry Summers

Â Identifies 5 factors as contributing to excess savings / zero lower bound problem:

- Slower population growth.*
- (Possibly) slower technological growth.*
- Rising income inequality.*
- Regulatory burdens raise the wedge between safe rates and rates charged to borrowers.
- Central bank policies that increases the demand for safe assets, which drives down safe (nominal) interest rates. *Overlap with Gordon

Â Also cites hysteresis in the capital and labor markets as contributing to a sustained downward shift in potential output.

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Cyclical or Secular?

- Arguments for each position are not mutually exclusive.
- It is possible that the Great Recession is/was a cyclical contraction made worse by a long-term decline in economic growth and/or by excess savings and the zero lower bound.
- "Only cyclical" conclusion ignores the data we looked at earlier.
- Review of the demographic data and the decline in real interest rates supports the secular stagnation label.
Something for Everyone #2

A recent study has found that women who carry a little extra weight live longer than the men who mention it.
Population Growth - U.S.

U.S., 1950

- 85+
- 80-84
- 75-79
- 70-74
- 65-69
- 60-64
- 55-59
- 50-54
- 45-49
- 40-44
- 35-39
- 30-34
- 25-29
- 20-24
- 15-19
- 10-14
- 5-9
- 0-4

Males

Females

- 20,000,000
- 10,000,000
- 0
- 10,000,000
- 20,000,000
Population Growth - U.S.

U.S., 1960

- Males
- Females
Population Growth - U.S.

U.S., 1970

[Bar chart showing population distribution by age and gender for the U.S. in 1970.]
Population Growth - U.S.

U.S., 1980

[Bar chart showing population growth by age and sex in 1980.]
Population Growth - U.S.

U.S., 1990
Population Growth - U.S.
Population Growth - U.S.
Population Growth - U.S.
Population Growth - U.S.
Population Growth - U.S.
Population Growth - U.S.

U.S., 2050
Population Growth - U.S.

Average Annual Growth in U.S. Population

- 1960-1970: 1.27%
- 1970-1980: 1.03%
- 1980-1990: 0.94%
- 1990-2000: 1.23%
- 2000-2010: 0.92%
- 2010-2020: 0.77%
- 2020-2030: 0.71%
- 2030-2040: 0.59%
- 2040-2050: 0.51%

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More Demographics

Labor Force Participation Rate
(12-Month Trailing Average)

End of Demographic Dividend?
Demographic Headwinds

- Slower population growth overall.
- Fewer workers supporting a growing older, and nonworking, population.
  - Burden of Social Security and Medicare constrains amount of fiscal stimulus.
  - Aging populations have higher levels of savings, increasing downward pressure on FERIR.
Demographic Headwinds

- Slower population growth overall.
- Fewer workers supporting a growing older, and nonworking, population.
  - Burden of Social Security and Medicare constrains amount of fiscal stimulus.
  - Aging populations have higher levels of savings, increasing downward pressure on FERIR.
- Post-recession decline in LF participation may reflect hysteresis in the labor market.
  - Could recover to pre-recession levels.
  - Demographic dividend cannot be repeated.
  - What will reverse long run decline in male participation?
Not Just the U.S.
(from The Economist, 11-19-2014)
Real Interest Rates – U.S.
Real Interest Rates – U.S.
Real Interest Rates – U.S.
Real Interest Rates – U.S.
Real Interest Rates – U.S.
Real Interest Rates – World
(Ex Post - King & Low)
Real Interest Rates

- Real Fed Funds rate is negative.
  - 2014 *ex ante* average equals -1.6%
  - Jan 2015 *ex ante* equals -0.8% (decrease in expected inflation)

- Clearly in a downward trend in the U.S. across all maturities and on an *ex post* and *ex ante* basis.

- Downward trend confirmed for world’s 10-year, *ex post*, real interest rate.

- Consistent with slower population growth, an aging population and increased supply of savings.
The Two Secular Views

Post 2014 Growth

- CBO Jan 2007 View: 2.55%
- CBO Jan 2015 View: 2.19%
- Robert Gordon: 1.59%
- CBO Forecast Jan 2015: 2.24%
Conclusion

Â Great Recession was a large cyclical contraction made worse by long-term decline in real potential growth.
Â Severity of Great Recession likely caused drop in potential GDP.
Â Demographic forces cannot be denied.
Â Declining real interest rates and low inflation confound the zero lower bound problem.
Â There are other significant factors to consider
   -- Income inequality
   -- Educational plateau
   -- Burden of government debt
   -- Regulatory uncertainty
   -- Unwinding of QE
   -- Reduced technology impact
Conclusion

Not sure whether decline in potential growth is best represented by Gordon (1.6%) or by CBO's current view (2.2%).
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What do you think?
  - Cyclical, secular or both?
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What do you think?

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- Gordon’s 1.6%, CBO’s 2.2% or something in between?
Conclusion

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What do you think?

- Cyclical, secular or both?
- Gordon’s 1.6%, CBO’s 2.2% or something in between?

It doesn’t matter for FE . . .

. . . But first ➔
Something for Everyone #3

...AND THAT’S HOW KARMA WORKS.
Why is it Ultimately FE?

From your first micro course:

Thus again we see that demand and supply exert coordinate influences on wages; neither has a claim to predominance; any more than has either blade of a pair of scissors, or either pier of an arch.

*Principles of Economics*

Alfred Marshall, 1890
Why is it Ultimately FE?

Plagiarized by Tucek:

Thus again we see that the growth rate and the discount rate exert coordinate influences on present value; neither has a claim to predominance; any more than has either blade of a pair of scissors, or either pier of an arch.
Why is it Ultimately FE?

Put more eloquently by Jim Rodgers:

The growth rate and the discount rate are threads from the same cloth – you have to pluck them together.
Why is it Ultimately FE?

Put more eloquently by Jim Rodgers:

The growth rate and the discount rate are threads from the same cloth – you have to pluck them together.

Cannot deny the math: i and g do not matter – it is their geometric difference that determines the present value.
Current Interest Rates and Historical Growth Rates

• Financial markets are forward-looking.

• Current interest rates reflect expectations about future inflation and future growth.

• Today’s rates do not incorporate the inflation or growth rates of the last 40, 30 or 20 years.

• Historical growth rates are out of synch with current interest rates.
Historical Interest Rates and Current Expected Growth Rates

Why would anyone do this?
(Reject out of hand)
Historical Interest Rates and Current Expected Growth Rates

Why would anyone do this?
(Reject out of hand)

PLUS

Current Expected Growth Rates Cannot be Observed
Can Only Substitute a Forecast of Growth Rates
Current Interest Rates and Forecasted Growth Rates

Whose forecast?

- Your own? (Good luck with that.)
Current Interest Rates and Forecasted Growth Rates

Â Whose forecast?

ï Your own? (Good luck with that.)

ï SSA’s? (Extremely stale; issued end of July 2014; no actual economic data beyond Q3-2013).
Current Interest Rates and Forecasted Growth Rates

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- Your own? (Good luck with that.)
- SSA’s? (Extremely stale: issued end of July 2014; no actual economic data beyond Q3-2013).
- CBO’s? (Not as stale, but gets staler every day until updated.)
Current Interest Rates and Forecasted Growth Rates

Å Whose forecast?

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÷ SSA’s? (Extremely stale – issued end of July 2014; no actual economic data beyond Q3-2013).
÷ CBO’s? (Not as stale, but gets staler every day until updated.)
÷ Purchased forecast like Moody’s Analytics? (Updated monthly so staleness not as big a problem . . . . but which one?)
Current Interest Rates and Forecasted Growth Rates

Å Whose forecast?
   ï Purchased forecast like Moody’s Analytics? (Updated monthly so staleness not as big a problem . . . . but which one?)

Å Which one? December 2014 Moody’s forecast consists of a baseline view plus 8 alternative scenarios (up from 6 in July):
   Scenario 1 - Stronger Near-Term Rebound
   Scenario 2 - Slower Near-Term Recovery
   Scenario 3 - Moderate Recession
   Scenario 4 - Protracted Slump
   Scenario 5 - Below-Trend Long-Term Growth
   Scenario 6 - Oil Price Increase, Dollar Crash Inflation
   Scenario 7 - Next-Cycle Recession
   Scenario 8 - Low Oil Price
Current Interest Rates and Forecasted Growth Rates

- The market considers both the cyclical and secular options, and many more alternative scenarios.

- The market considers more data and options than any single forecast.

- Even if the forecast considered the same data and options as the market, there is no expectation that they are afforded the same weight.
Cyclical or Secular: Why is it Ultimately FE?

• The market considers both the cyclical and secular options, and many more alternative scenarios.

• The market considers more data and options than any single forecast.

• Even if the forecast considered the same data and options as the market, there is no expectation that they are afforded the same weight.

• Any forecast is a thread from a different cloth. It cannot be consistent with the expectations embodied in current interest rates, except through chance.
## Historical Interest Rates and Historical Growth Rates

Is the Only Remaining Option

<table>
<thead>
<tr>
<th>Growth</th>
<th>Interest Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast</td>
<td>Current: X</td>
</tr>
<tr>
<td>Historical</td>
<td>Current: X</td>
</tr>
</tbody>
</table>
Something for Everyone #4

CAMOUFLAGE
Protecting men from “Honey-Do’s” since 1902
Historical Interest Rates and Historical Growth Rates Is the Only Remaining Option

\[\begin{array}{c|cc}
\text{Growth} & \text{Forecast} & \text{Historical} \\
\hline
\text{Interest Rates} & \text{Current} & \text{Historical} \\
\hline
\text{Forecast} & X & X \\
\text{Historical} & X & \text{Only Viable Option} \\
\end{array}\]

. . . the FE is not off the hook:
Â Consistency requirement equates to stationarity.
Â Addressing the stationarity question involves more than running a statistical test and calling it quits.
Concept Review #1

Â Type 1 Error: Reject the null hypothesis when it is in fact true.

Â Type 2 Error: Fail to reject the null when the alternative hypothesis is true.

Â Reject the null hypothesis at a 95% level of confidence, you will be wrong (Type 1 error) 5% of the time.

Â If you do not reject the null hypothesis (and instead accept it) the probability of being wrong (Type 2 error) is not 5%.
Concept Review #1

If you do not reject the null hypothesis (and instead accept it) the probability of being wrong (Type 2 error) is not 5%.

Failing to reject the null hypothesis of a unit root is not the same as accepting it and does not mean the series in question is not stationary.
Augmented Dickey-Fuller equation

\[ Y_t = \alpha + \rho Y_{t-1} + \sum \lambda_j \Delta Y_{t-j} + \varepsilon_t \]

- \(|\rho| < 1 \rightarrow \text{stationary}\)
- \(|\rho| = 1 \rightarrow \text{not stationary (unit root)}\)
- \(|\rho| > 1 \rightarrow \text{explosive}\)

- \(H_0: |\rho| = 1\) (unit root)
- \(H_1: |\rho| < 1\)
Concept Review #2

Augmented Dickey-Fuller equation

\[ Y_t = \alpha + \rho Y_{t-1} + \sum \lambda_j \Delta Y_{t-j} + \varepsilon_t \]

| \( |\rho| < 1 \) | stationary |
| --- | --- |
| \( |\rho| = 1 \) | not stationary (unit root) |
| \( |\rho| > 1 \) | explosive |

Suppose \( |\rho| \) is less than but very close to 1.

Difficult to distinguish between this circumstance and \( |\rho|=1 \).

Tests for stationarity are weak.

H₀: \( |\rho| = 1 \) (unit root)

H₁: \( |\rho| < 1 \)
My Approach

• Look at the data.

• Look at the autocorrelogram.

• Perform 3 tests for stationarity (EViews)
  - Augmented Dickey-Fuller
  - Phillips-Perron with Bartlett Kernel
  - Phillips-Perron with OLS autoregressive spectral

• Estimate $\rho$ and its standard error; look at distance between $|\rho|$ and 1 relative to the standard error.
My Approach

- Look at the data.
- Look at the autocorrelogram.
- Perform 3 tests for stationarity (EViews)
  - Augmented Dickey-Fuller
  - Phillips-Perron with Bartlett Kernel
  - Phillips-Perron with OLS autoregressive spectral estimate
- Estimate $\rho$ and its standard error; look at distance between $|\rho|$ and 1 relative to the standard error. $\rho$ & SE corrected for bias.

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An Example

Å NDR based on *ex ante* 10-year real rate and growth in real average weekly earnings. (Average Weekly Earnings of Total Private Production and Nonsupervisory Employees, deflated by CPI-U; growth from 1-year earlier.)

Å Two time periods:

- Jan 1988 through Dec 2014 (End of Volcker term as Fed chairman)
- Jan 2001 through Dec 2014 (Last 2 expansions are birds of a feather)
Look at the Data: Jan 1988 Start
Look at the Data:
Jan 2001 Start
Autocorrelogram: Jan 1988 Start
Autocorrelogram:
Jan 2001 Start
Formal Stationarity Tests

<table>
<thead>
<tr>
<th>Time Period</th>
<th>ADF</th>
<th>Bartlett Kernel</th>
<th>AR OLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 1988 - Dec 2014</td>
<td>0.45658</td>
<td>0.13884</td>
<td>0.51421</td>
</tr>
<tr>
<td>Jan 2001 - Dec 2014</td>
<td>0.00620</td>
<td>0.01543</td>
<td>0.00475</td>
</tr>
</tbody>
</table>
Distance of $|\rho|$ from 1

\[ Y_t = \alpha + \rho Y_{t-1} + \varepsilon_t \]

| Time Period         | OLS Estimate of $\rho$ | OLS Estimate of $\rho$ Corrected for Bias | Corrected SE of $\rho$ | $1 - |\rho|$ Divided by SE of $\rho$ |
|---------------------|-------------------------|-------------------------------------------|------------------------|----------------------------------|
| Jan 1988 - Dec 2014 | 0.95636                 | 0.96546                                   | 0.01805                | 1.91391                          |
| Jan 2001 - Dec 2014 | 0.88093                 | 0.89777                                   | 0.03912                | 2.61308                          |
Distance of $|\rho|$ from 1

(Orcutt and Winokur, 1969)

$$\rho_{OW} = \left(\frac{N}{(N-3)}\right) \cdot \rho_{OLS} + \frac{1}{(N-3)}$$

$$\text{Var}(\rho_{OLS}) = \frac{(1-\rho^2)}{(N-1)} - \frac{(1 - 14\rho^2)}{(N-1)^2}$$

Since, for any random variable $X$,

$$\text{Var}(a + b \cdot X) = b^2 \cdot \text{Var}(X),$$

it follows that

$$\text{Var}(\rho_{OW}) = \left[\frac{N}{(N-3)}\right]^2 \cdot \left[\frac{(1-\rho^2)}{(N-1)} - \frac{(1 - 14\rho^2)}{(N-1)^2}\right]$$
The Nieswiadomow Insight

It takes time to determine if the x’s are a temporary aberration or a regime change.


References


References

Summers, Lawrence H., Speech at the IMF Economic Forum, Nov. 8, 2013, transcript downloaded from:


References


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