Unemployment and Business Cycles

Counter-Cyclical and Pro-Cyclical Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Counter-Cyclical</th>
<th>Pro-Cyclical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Failures</td>
<td>Counter-Cyclical</td>
<td></td>
</tr>
<tr>
<td>New Business Starts</td>
<td>Pro-Cyclical</td>
<td></td>
</tr>
<tr>
<td>Unemployment</td>
<td>Counter-Cyclical</td>
<td></td>
</tr>
<tr>
<td>Average Work Week</td>
<td>Pro-Cyclical</td>
<td></td>
</tr>
<tr>
<td>Average Wage Rate</td>
<td>Pro-Cyclical</td>
<td></td>
</tr>
<tr>
<td>Capital Utilization</td>
<td>Pro-Cyclical</td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>Pro-Cyclical</td>
<td></td>
</tr>
</tbody>
</table>

A Change in Demand

We know a temporary demand reduction causes a business cycle.
Unemployment and Business Cycles

A Change in Demand

We know a temporary demand reduction causes a business cycle. So what does it do to unemployment?

Unemployment and Business Cycles

A Modest Proposal

We know a temporary demand reduction causes a business cycle. So what does it do to unemployment?

Ergo, U is counter cyclical.

Unemployment and Business Cycles

The Formal Relation

• GDP
  – Actual GDP = what you think it is
  – Potential GDP = GDP when U = U_n

• Employment
  – Actual Employment = CLF(1-U)
  – Potential Employment = CLF(1-U_n)

The Formal Relation

GDP and Unemployment

\[
GDP_{Actual} = AK_t^{\frac{1}{3}} \left[ CLF(1-U) \right]^{\frac{2}{3}}
\]
Potential GDP & the Natural Rate

\[ GDP_{Potential} = A_t \cdot K_t^\frac{1}{3} \cdot [CLF(1 - U_n)]^{\frac{2}{3}} \]

GDP and Unemployment

\[ GDP_{Potential} = A_t \cdot K_t^\frac{1}{3} \cdot [CLF(1 - U_n)]^{\frac{2}{3}} \]
\[ GDP_{Actual} = A_t \cdot K_t^\frac{1}{3} \cdot [CLF(1 - U)]^{\frac{2}{3}} \]

The Relation

\[ \frac{GDP_{Potential} - GDP_{Actual}}{GDP_{Actual}} \approx \left( \frac{2}{3} \right)(U - U_n) \]

Unemployment and GDP

\[ U \approx U_n + 1.5 \frac{GDP_{Potential} - GDP_{Actual}}{GDP_{Actual}} \]

An Illustration

\[ \frac{GDP_{Potential} - GDP_{Actual}}{GDP_{Actual}} \approx \left( \frac{2}{3} \right)(U - U_n) \]

**GDP is $10 trillion; U_n = 4%; U = 7%**

An Illustration

\[ \frac{GDP_{Potential} - $10}{$10} \approx \left( \frac{2}{3} \right)(7 - 4) \]
\[ GDP_{Potential} = $10.2\ Trillion \]

**GDP is $10 trillion; U_n = 4%; U = 7%**
**Unemployment and Business Cycles**

**A Second Illustration**

\[
\frac{GDP_{\text{Potential}} - GDP_{\text{Actual}}}{GDP_{\text{Actual}}} \approx \left(\frac{2}{3}\right)(U - U_n)
\]

GDP grew from $10\text{ Trillion}$ to $10.45\text{ Trillion}

What will happen to $U$?

**Okun’s Law**

\[
\frac{GDP_{\text{Potential}} - GDP_{\text{Actual}}}{GDP_{\text{Actual}}} \approx \left(\frac{2}{3}\right)(U - U_n)
\]

\[
\frac{\Delta GDP_{\text{Potential}}}{GDP_{\text{Potential}}} \approx \left(\frac{2}{3}\right)\Delta U
\]

\[
\frac{\Delta GDP_{\text{Actual}}}{GDP_{\text{Actual}}} \approx \left(\frac{2}{3}\right)\Delta U
\]

GDP grew from $10\text{ Trillion}$ to $10.45\text{ Trillion}

What will happen to $U$?

**Okun’s Law**

\[
\frac{GDP_{\text{Potential}} - GDP_{\text{Actual}}}{GDP_{\text{Actual}}} \approx \left(\frac{1}{2}\right)(U - U_n)
\]

\[
\frac{\Delta GDP_{\text{Potential}}}{GDP_{\text{Potential}}} \approx \left(\frac{1}{2}\right)\Delta U
\]

\[
\frac{\Delta GDP_{\text{Actual}}}{GDP_{\text{Actual}}} \approx \left(\frac{1}{2}\right)\Delta U
\]

GDP grew from $10\text{ Trillion}$ to $10.45\text{ Trillion}

What will happen to $U$?
The Facts

Change in GDP vs Change in U

Unemployment data from BLS, GDP data from Dept of Commerce

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