Intermediate Macroeconomic Theory

Costas Azariadis

Lecture 7: A Review of Business Cycles
1. U.S. CYCLES: A BRIEF REVIEW

a) Typical cycles

- peaks & troughs
- contractions & expansions
- What is a Great Recession or Depression?
- What is a Financial Crisis?
A Review of Business Cycles
### A Review of Business Cycles

#### BUSINESS CYCLE REFERENCE DATES

<table>
<thead>
<tr>
<th>Peak</th>
<th>Trough</th>
<th>Contraction</th>
<th>Expansion</th>
<th>Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Peak to Trough</td>
<td>Previous trough to this peak</td>
<td>Trough from Previous Trough</td>
</tr>
</tbody>
</table>

#### Civil War
- June 1857 (II) to December 1858 (IV): 18 months
- October 1860 (III) to June 1861 (III): 18 months
- April 1865 (I) to December 1867 (I): 32 months
- **June 1869 (II)** to December 1870 (IV): 18 months
- October 1873 (III) to March 1879 (I): 65 months
- March 1882 (I) to May 1885 (II): 38 months
- March 1887 (II) to April 1888 (I): 13 months
- July 1890 (III) to May 1891 (II): 10 months
- January 1893 (I) to June 1894 (II): 17 months
- December 1895 (IV) to June 1897 (II): 18 months
- June 1899 (III) to December 1900 (IV): 18 months
- September 1902 (IV) to August 1904 (III): 23 months
- May 1907 (II) to June 1908 (II): 13 months
- January 1910 (I) to January 1912 (IV): 24 months
- January 1913 (I) to December 1914 (IV): 23 months

#### WWI
- **August 1918 (III)** to March 1919 (I): 7 months
- January 1920 (I) to July 1921 (III): 18 months
- May 1923 (II) to July 1924 (III): 14 months
- October 1926 (III) to November 1927 (IV): 13 months

#### Depression
- August 1929 (III) to March 1933 (I): 43 months
- May 1937 (II) to June 1938 (II): 13 months
- **February 1945 (I)** to October 1945 (IV): 8 months
- November 1948 (IV) to October 1949 (IV): 11 months
- July 1953 (II) to May 1954 (II): 10 months
- August 1957 (III) to April 1958 (II): 8 months
# A Review of Business Cycles

<table>
<thead>
<tr>
<th>Vietnam</th>
<th></th>
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<tbody>
<tr>
<td>April 1960(II)</td>
<td><strong>February 1961 (I)</strong></td>
<td>10</td>
<td>24</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>December 1969(IV)</td>
<td><strong>November 1970 (IV)</strong></td>
<td>11</td>
<td>106</td>
<td>117</td>
<td>116</td>
</tr>
<tr>
<td>November 1973(IV)</td>
<td><strong>March 1975 (I)</strong></td>
<td>16</td>
<td>36</td>
<td>52</td>
<td>47</td>
</tr>
<tr>
<td>January 1980(I)</td>
<td><strong>July 1980 (III)</strong></td>
<td>6</td>
<td>58</td>
<td>64</td>
<td>74</td>
</tr>
<tr>
<td>July 1981(III)</td>
<td><strong>November 1982 (IV)</strong></td>
<td>16</td>
<td>12</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>July 1990(III)</td>
<td><strong>March 1991 (I)</strong></td>
<td>8</td>
<td>92</td>
<td>100</td>
<td>108</td>
</tr>
<tr>
<td><strong>March 2001 (I)</strong></td>
<td><strong>November 2001 (IV)</strong></td>
<td>8</td>
<td>120</td>
<td>128</td>
<td>128</td>
</tr>
<tr>
<td>December 2007 (IV)</td>
<td><strong>June 2009 (II)</strong></td>
<td>18</td>
<td>73</td>
<td>91</td>
<td>81</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Average, all cycles:</th>
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<tbody>
<tr>
<td>1854-2009 (33 cycles)</td>
</tr>
<tr>
<td>1854-1919 (16 cycles)</td>
</tr>
<tr>
<td>1919-1945 (6 cycles)</td>
</tr>
<tr>
<td>1945-2009 (11 cycles)</td>
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</tbody>
</table>

CONTRACTIONS  EXPANSIONS
↓  ↓
Shorten  Lengthen

* 32 cycles
** 15 cycles

Source: NBER
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b) Brief Synopsis of the record: 1854-

32 expansions vs. 32 contractions
Longest expansion = 120 months (1991-2001)
Longest contraction = 43 months (1929-33)
Average expansion = 37 mons
Average contraction = 17 mons

Postwar expansion average = 59
Postwar contraction average = 10.5

better control? or faster growth?
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c) The Great Moderation
Longer expansions after WW II
Shorter contractions after WW II (until 2007)

Especially so since 1982
→ 3 exp. with total length
≈ 292 months
→ 3 contr. with total length
≈ 34 months

• We were spoiled
• General decline, after 1982, in the volatility of GDP, C,I.
  short-lived or permanent?
Std. deviation of GDP Growth = 4% 1960-85
= 2% since 1985
d) Employment & unemployment

Since 1965:
• employment doubles
• unemployment rate rarely exceeds 8% until 2008 (last time in 1983)
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[Graph showing job finding rate (percent per month) from 1976 to 2009 with peaks labeled PT and a trough labeled P.]
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e) Other Facts

**International business cycles**
- Big recessions / booms are common to all large industrial economies
- Small recessions & booms are typically not shared by all nations
- International cycles more co-ordinated since 1980

**Seasonal cycle in U.S.**
- Not shown in national accounts because time series for (Y, C, I, etc) are seasonally adjusted
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Note: Scales differ by country

United States

United Kingdom

Germany

Japan

Canada

France

Unadjusted data show GDP growth rate from quarter to quarter

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<table>
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<tr>
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<tbody>
<tr>
<td>I→II</td>
<td>+4%</td>
<td></td>
</tr>
<tr>
<td>II→III</td>
<td>+2%</td>
<td></td>
</tr>
<tr>
<td>III→IV</td>
<td>+5%</td>
<td></td>
</tr>
<tr>
<td>IV→V</td>
<td>-8%</td>
<td></td>
</tr>
<tr>
<td>y on y growth</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>

Seasonal cycle is much bigger than business cycle
2. EXPLAINING BUSINESS CYCLES: THE RBC MODEL

Emphasis on supply side shocks or TFP shocks

b) **Key idea:** Use Solow-type model with TFP shocks to understand business cycles
c) **Role of Productivity Shocks**

Suppose TFP may be either high or low in the standard Solow Model

\[ k_{t+1} = H(k_t, A_t) \]

\[ \equiv \frac{1}{1+n} \left[ sA_t k_t^\alpha + (1 - \delta)k_t \right] \]

Where TFP can change, i.e.

\[ A_t \in \{A_H, A_L\} A_L < A_H \]
Then $k_t$ goes to $k_H^*$ if $A_t$ always equals $A_H$

and to $k_L^*$ if $A_t$ always equals $A_L$

$A_t = A_H$

$A_t = A_L$
Typically $A_t$ will switch values and $y_t$ will fluctuate between an upper bound $A_H k_H^*$ and a lower bound $A_L k_L^*$

**Example:** $A_t$ is

- $A_H$ in even time periods $t=0, 2, 4…$
- $A_L$ in odd time periods $t=1, 3, 5…$

The $k_t$ is periodic:

\[
(k_t, y_t) = (\hat{k}_H, A_H \hat{k}_H^\alpha) \text{ for } t = 0, 2, 4
\]

\[
(\hat{k}_L, A_L \hat{k}_L^\alpha) \text{ for } t = 1, 3, 5
\]
More Generally: If $A_t$ equals $A_H$ for a few periods then switches back to $A_L$ for a few more, expansions will be followed by contractions:
d) **What is a TFP shock?**

- Pure technology: changes in the production possibility frontier
- Improvements in Market Performance
  - competition v. monopoly
- Changes in Tax Distortions
  - consumption v. output taxes
  - impediments to trade (tariffs, etc)
- Improved Capital and Labor Mobility
  - reallocating inputs from declining to expanding industries
  - role of finance, banking and insurance
- Intermediary between savers and Investors

\[
k_{t+1} = H(k_t, A_t)
\equiv \frac{1}{1 + n} \left[ sA_t k_t^\alpha + (1 - \delta)k_t \right]
\]
Example: Banking Industry converts $1 of deposits to $A_t < 1 of loans

Solow model exactly as before with technology

\[ Y_t = K_t^\alpha N_t^{1-\alpha} \]

\[ k_{t+1} = H(k_t, A_t) = \frac{1}{1+n} \left[ sA_t k_t^\alpha + (1 - \delta)k_t \right] \]

With new interpretation…

At is not TFP; it’s the efficiency of the banking system.

Business cycles are caused by changes in that efficiency.