

Intermediate Macroeconomic Theory

Costas Azariadis

Lecture 7: A Review of Business Cycles

A Review of Business Cycles

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1. U.S. CYCLES: A BRIEF REVIEW

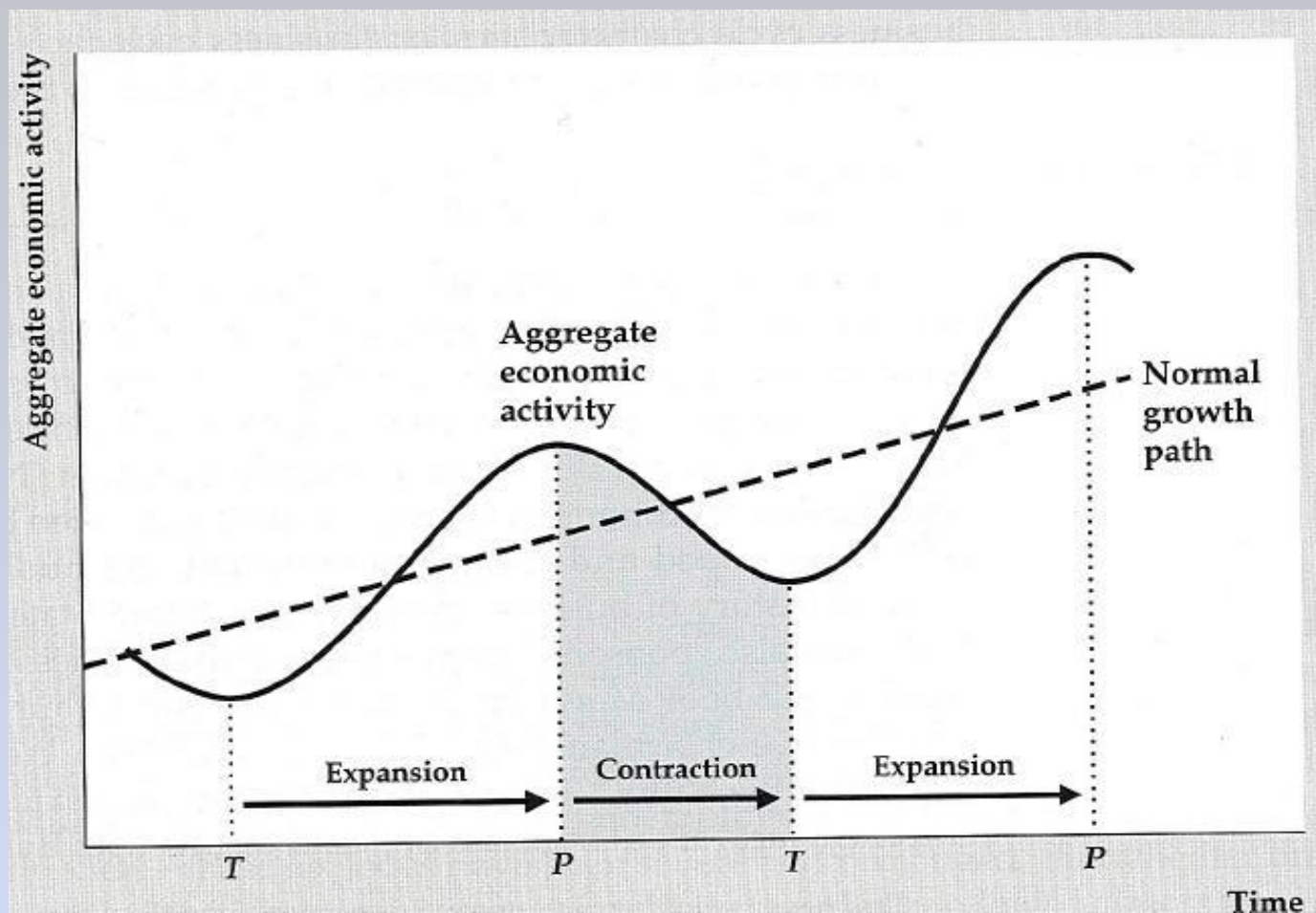
a) Typical cycles

- peaks & troughs
- contractions & expansions
- What is a Great Recession or Depression?
- What is a Financial Crisis?

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<u>BUSINESS CYCLE REFERENCE DATES</u>		<u>DURATION IN MONTHS</u>			
Peak	Trough	Contraction	Expansion	Cycle	
<i>Quarterly dates are in parentheses</i>		<i>Peak to Trough</i>	<i>Previous trough to this peak</i>	<i>Trough from Previous Trough</i>	<i>Peak from Previous Peak</i>
	December 1854 (IV)	--	--	--	--
June 1857(II)	December 1858 (IV)	18	30	48	--
October 1860(III)	June 1861 (III)	8	22	30	40
April 1865(I)	December 1867 (I)	32	46	78	54
June 1869(II)	December 1870 (IV)	18	18	36	50
October 1873(III)	March 1879 (I)	65	34	99	52
March 1882(I)	May 1885 (II)	38	36	74	101
March 1887(II)	April 1888 (I)	13	22	35	60
July 1890(III)	May 1891 (II)	10	27	37	40
January 1893(I)	June 1894 (II)	17	20	37	30
December 1895(IV)	June 1897 (II)	18	18	36	35
June 1899(III)	December 1900 (IV)	18	24	42	42
September 1902(IV)	August 1904 (III)	23	21	44	39
May 1907(II)	June 1908 (II)	13	33	46	56
January 1910(I)	January 1912 (IV)	24	19	43	32
January 1913(I)	December 1914 (IV)	23	12	35	36
August 1918(III)	March 1919 (I)	7	44	51	67
January 1920(I)	July 1921 (III)	18	10	28	17
May 1923(II)	July 1924 (III)	14	22	36	40
October 1926(III)	November 1927 (IV)	13	27	40	41
August 1929(III)	March 1933 (I)	43	21	64	34
May 1937(II)	June 1938 (II)	13	50	63	93
February 1945(I)	October 1945 (IV)	8	80	88	93
November 1948(IV)	October 1949 (IV)	11	37	48	45
July 1953(II)	May 1954 (II)	10	45	55	56
August 1957(III)	April 1958 (II)	8	39	47	49

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Vietnam				
April 1960(II)	February 1961 (I)	10	24	34
December 1969(IV)	November 1970 (IV)	11	106	117
November 1973(IV)	March 1975 (I)	16	36	52
January 1980(I)	July 1980 (III)	6	58	64
July 1981(III)	November 1982 (IV)	16	12	28
Moderation				
July 1990(III)	March 1991(I)	8	92	100
March 2001(I)	November 2001 (IV)	8	120	128
December 2007 (IV)	June 2009 (II)	18	73	91
Average, all cycles:				
1854-2009 (33 cycles)		16	42	56
1854-1919 (16 cycles)		22	27	48
1919-1945 (6 cycles)		18	35	53
1945-2009 (11 cycles)		11	59	73
		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

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d) Employment & unemployment

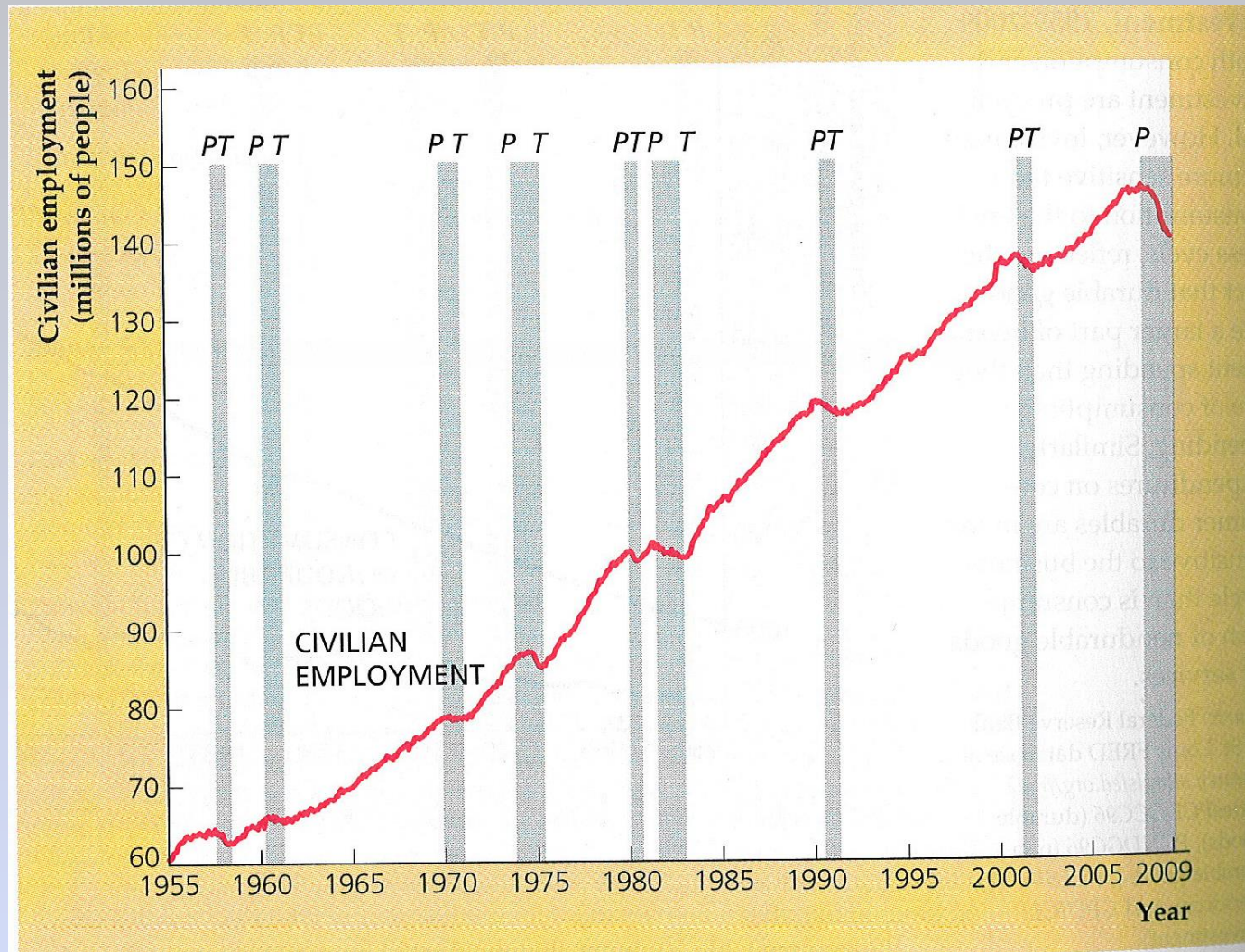
Since 1965:

- employment doubles
- unemployment rate rarely exceeds 8% until 2008
(last time in 1983)

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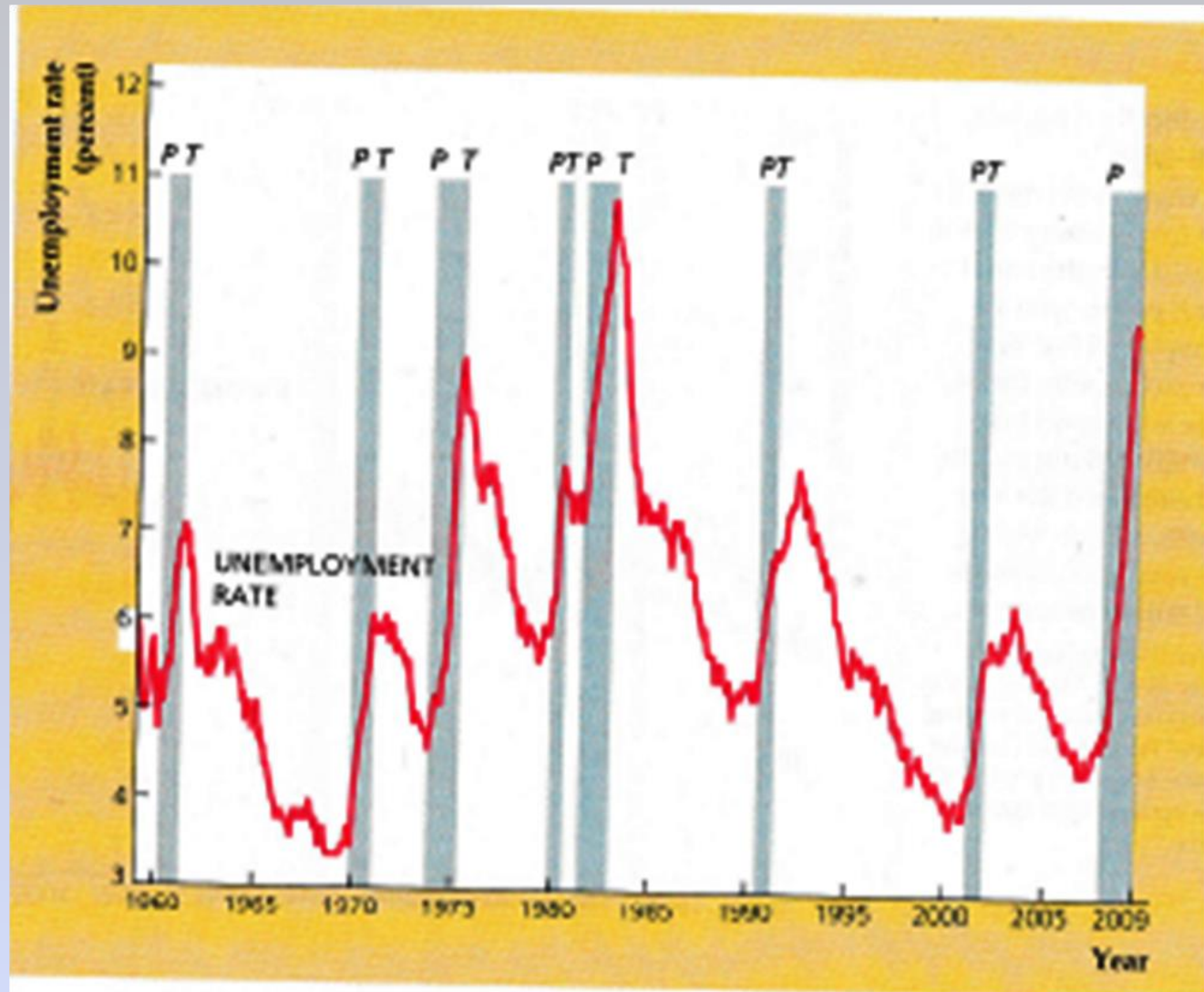
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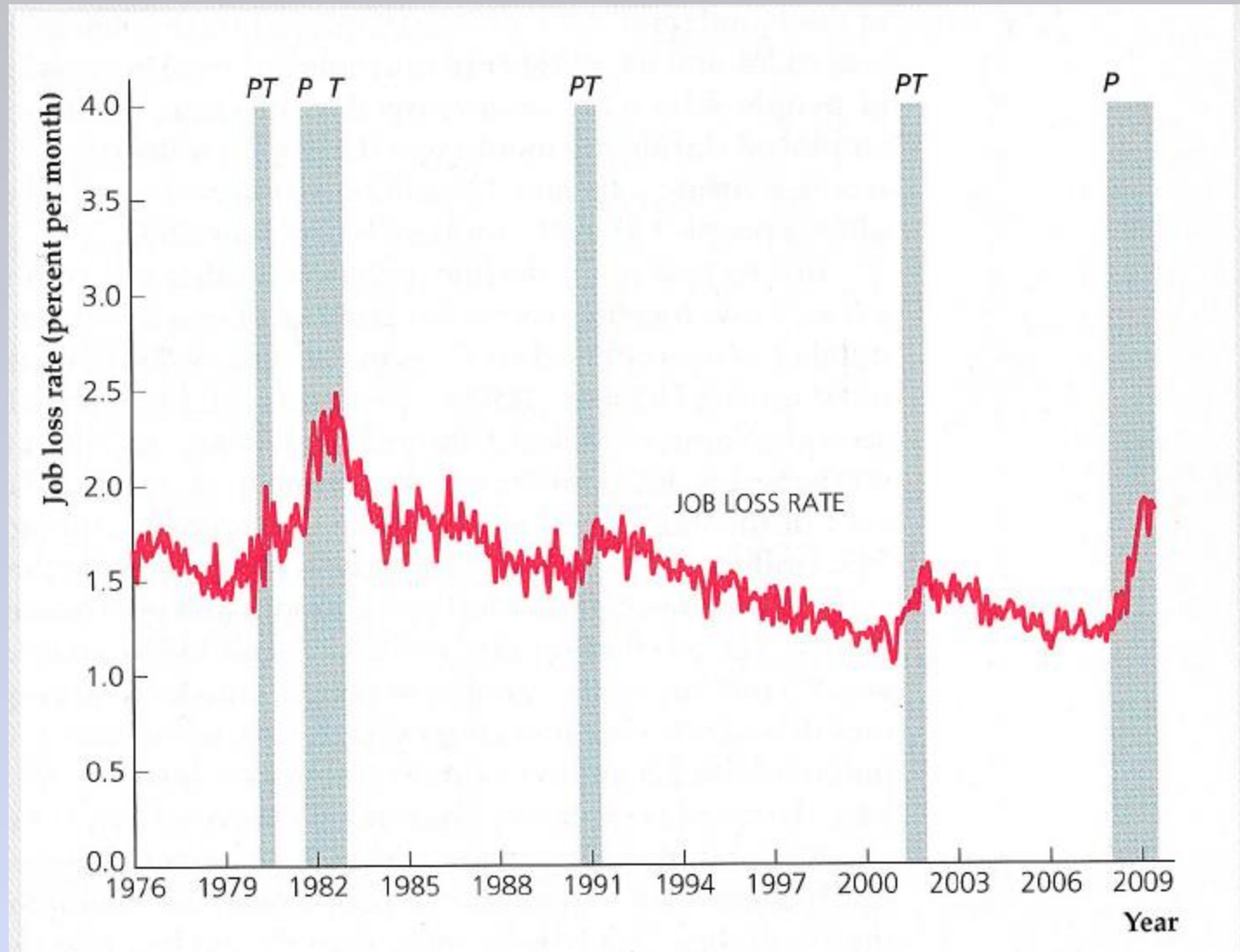
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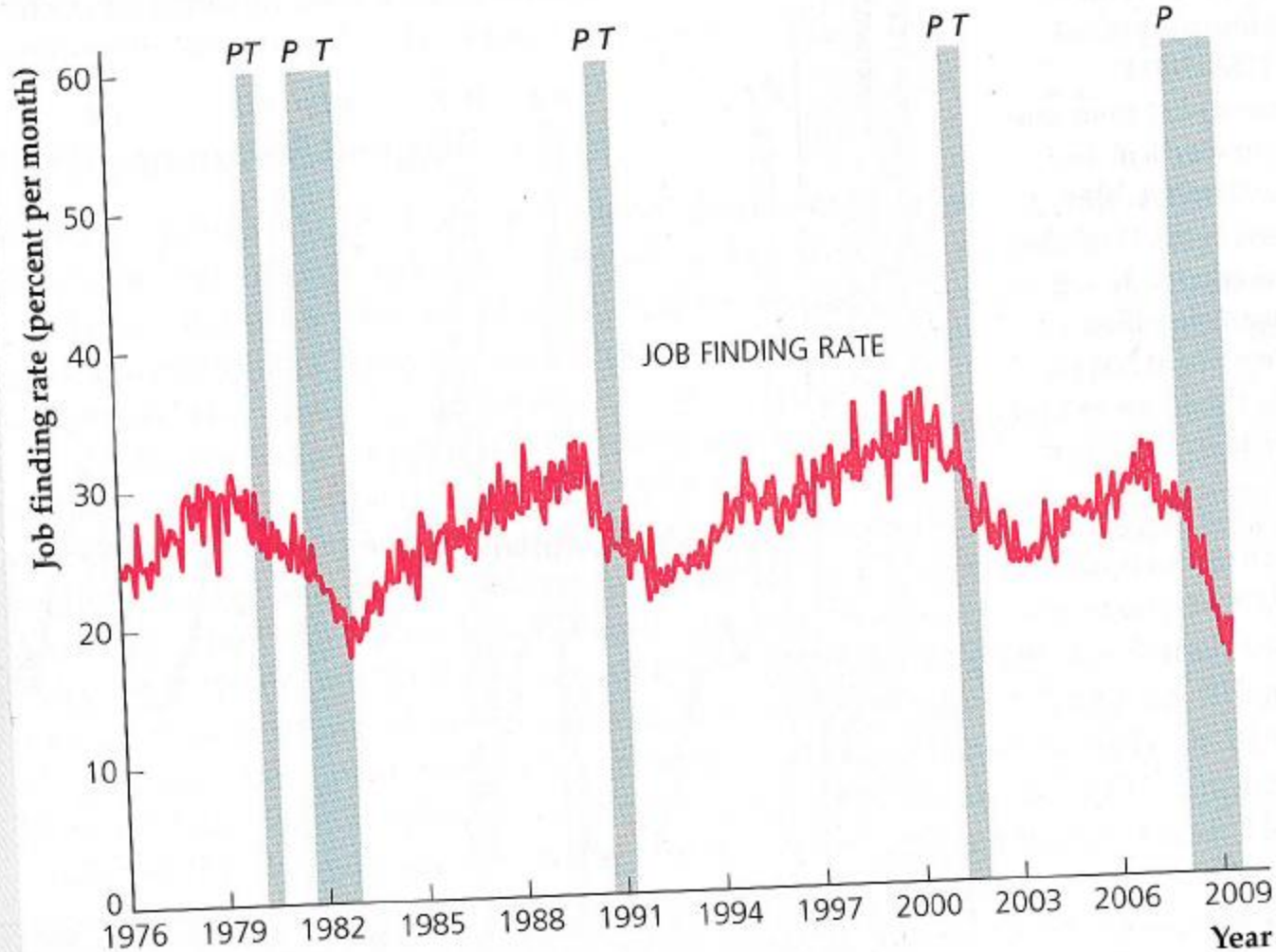
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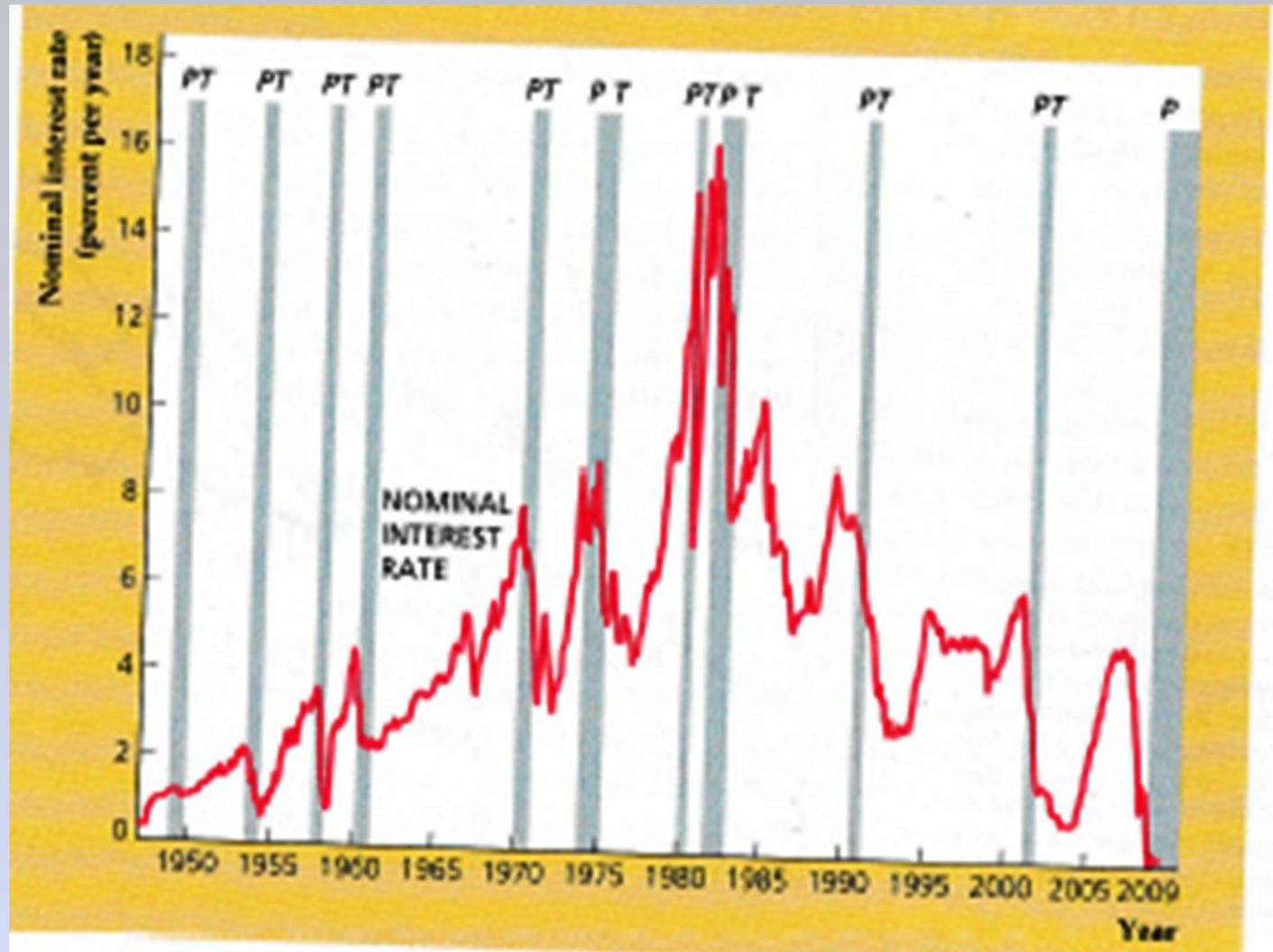
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e) Other Facts

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

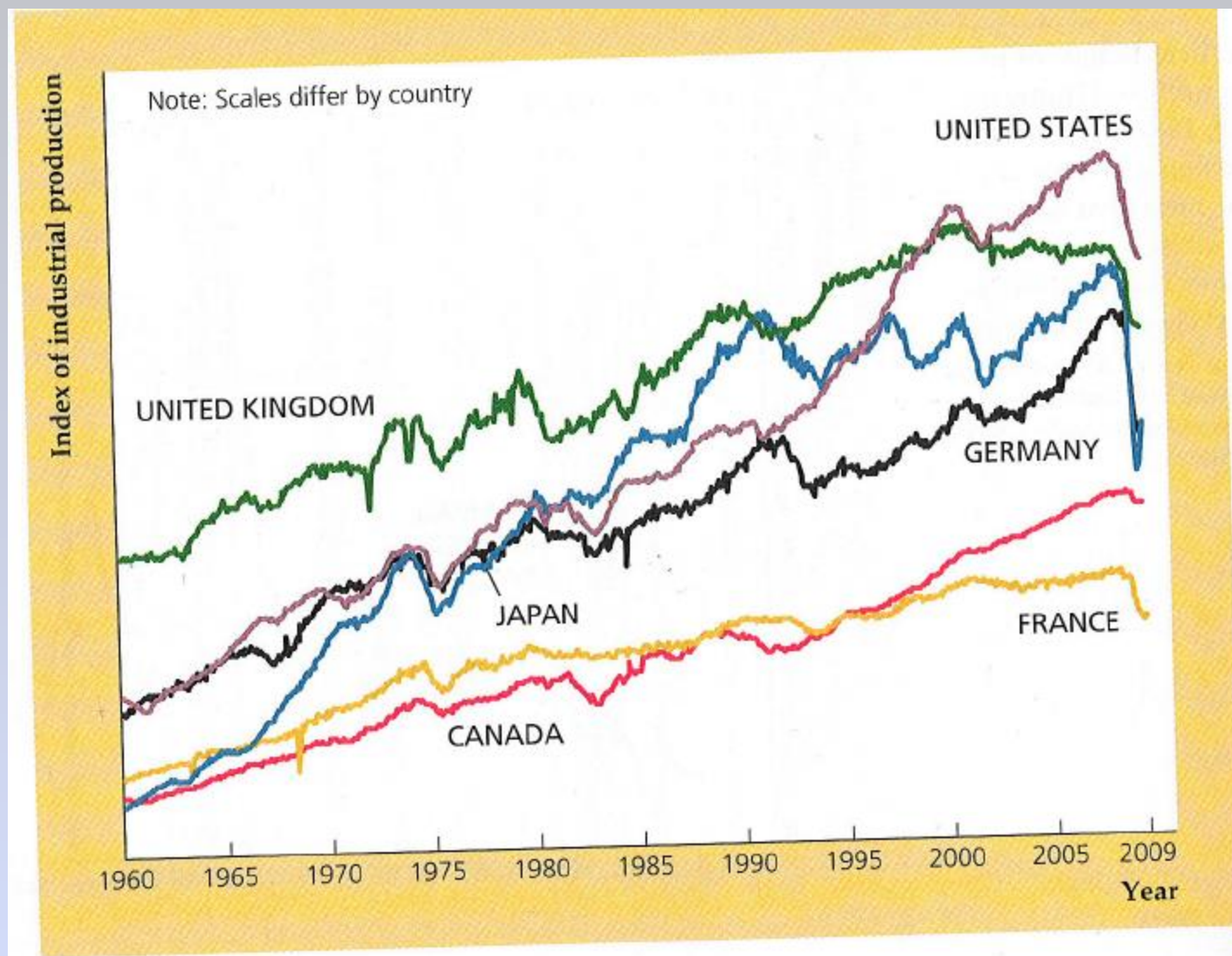
Seasonal cycle in U.S.

- Not shown in national accounts because time series for (Y, C, I, etc) are **seasonally adjusted**

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Unadjusted data show GDP growth rate from quarter to quarter

Table 1	
I → II	+4%
II → III	+2%
III → IV	+5%
IV → V	-8%
y on y growth	3%

Seasonal cycle is much bigger than business cycle

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2. EXPLAINING BUSINESS CYCLES: THE RBC MODEL

a) Neoclassical theory by F. Kydland & E. Prescott (1982)
(Nobel prize 2004)

Emphasis on supply side shocks or TFP shocks

b) **Key idea:** Use Solow-type model with TFP shocks to understand business cycles

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c) **Role of Productivity Shocks**

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

$$\begin{aligned} k_{t+1} &= H(k_t, A_t) \\ &\equiv \frac{1}{1+n} \left[s A_t k_t^\alpha + (1-\delta) k_t \right] \end{aligned}$$

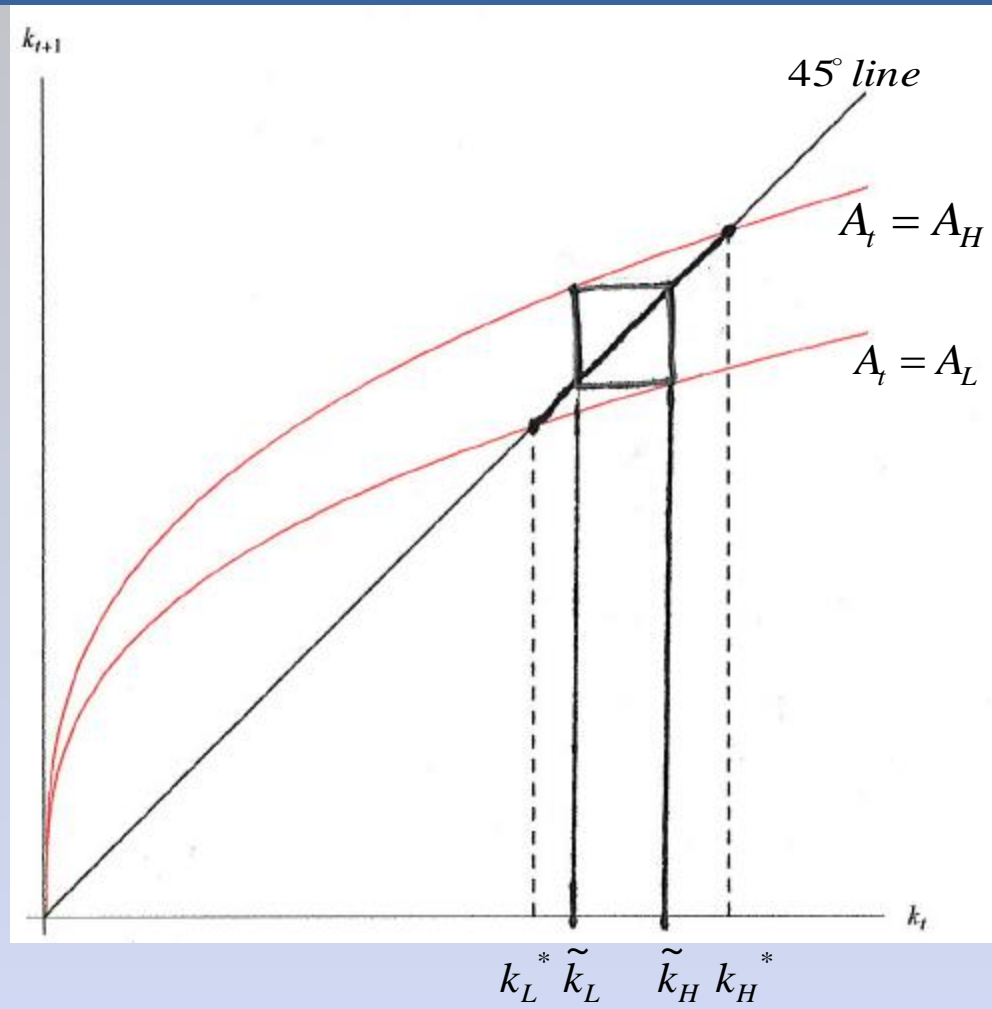
Where TFP can change, i.e.

$$A_t \in \{A_H, A_L\} \quad A_L < A_H$$

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Then k_t $\rightarrow k_H^*$ if A_t always equals A_H
 $\rightarrow k_L^*$ if A_t always equals A_L

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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
$$\begin{cases} A_H & \text{in even time periods } t=0,2,4\dots \\ A_L & \text{in odd time periods } t=1,3,5\dots \end{cases}$$

The k_t is periodic:

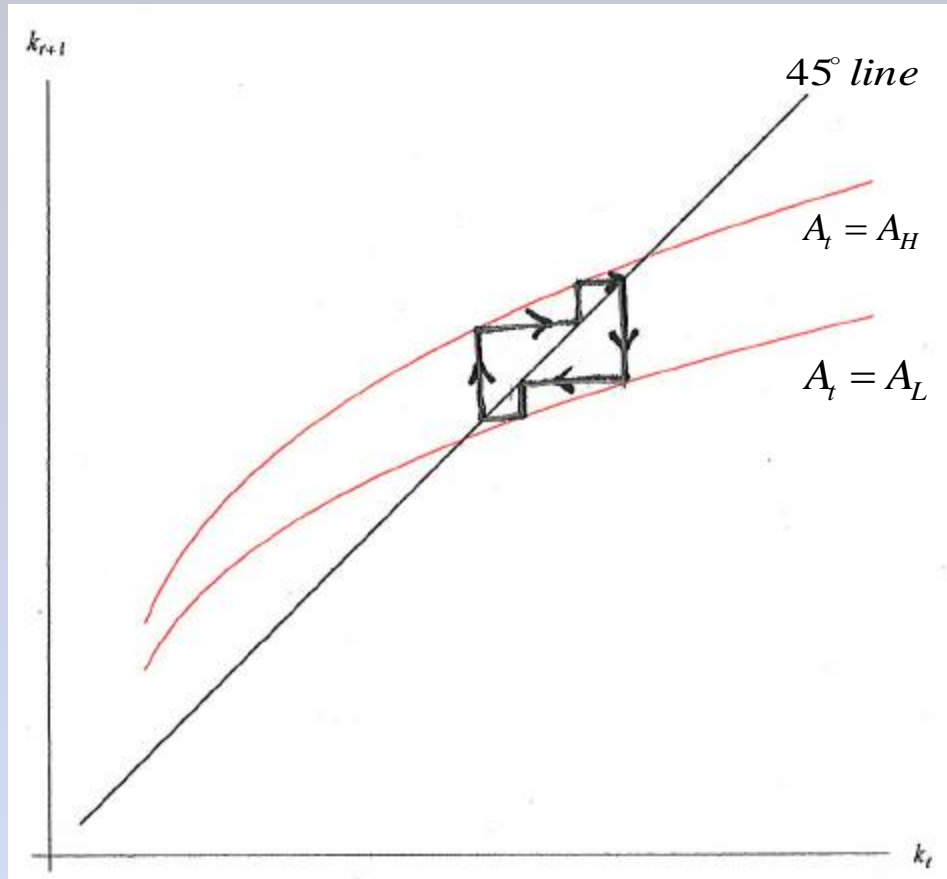
$$(k_t, y_t) = \begin{cases} (\hat{k}_H, A_H \hat{k}_H^\alpha) & \text{for } t = 0,2,4 \\ (\hat{k}_L, A_L \hat{k}_L^\alpha) & \text{for } t = 1,3,5 \end{cases}$$

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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:



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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

$$\begin{aligned} k_{t+1} &= H(k_t, A_t) \\ &\equiv \frac{1}{1+n} \left[s A_t k_t^\alpha + (1-\delta) k_t \right] \end{aligned}$$

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Example: Banking Industry converts \$1 of deposits to $A_t < 1$ of loans

Solow model exactly as before with technology $Y_t = K_t^\alpha N_t^{1-\alpha}$

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

With new interpretation...

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

Business cycles are caused by changes in that efficiency.