

Chapter 5 Selected Answers

Problem 5.3:

Table 5.3.1. Characteristics of U.S. Business Cycles: 1947-present
(percentage change in real GDP)

	Mean	Median
Recession series	-1.6	-1.8
Expansion series	24.3	20.2
Trough to trough series	22.8	19.1
Peak to peak series	22.6	18.5

Note: Table 5.3.1 is based on Tables 5.3.2 and 5.3.3 below.

Table 5.3.2.
Percentage Change in Real GDP in Recessions and Expansions: 1947- Present

Recession	Percentage change	Expansion	Percentage change
1948:4-1949:4	-1.7	1949:4-1953:3	27.9
1953:3-1954:2	-2.0	1954:2-1957:3	13.3
1957:3-1958:2	-3.2	1958:2-1960:2	11.7
1960:2-1961:1	-0.5	1961:1-1969:4	51.2
1969:4-1970:4	-0.2	1970:4-1973:4	16.3
1973:4-1975:1	-3.1	1975:1-1980:1	23.2
1980:1-1980:3	-2.2	1980:3-1981:3	4.4
1981:3-1982:4	-2.6	1982:4-1990:3	37.4
1990:3-1991:1	-1.3	1991:1-2001:1	40.3
2001:1-2001:4	+0.3	2001:4-2007:4	17.3
Mean	-1.6		22.8
Median	-1.8		19.1

Table 5.3.3.
Percentage Change in Real GDP in Complete Cycles: 1947- Present

Trough to trough	Percentage change	Peak to peak	Percentage change
1949:4-1954:2	25.4	1948:4-1953:3	25.9
1954:2-1958:2	9.9	1953:3-1957:3	11.3
1958:2-1961:1	11.1	1957:3-1960:2	8.2
1961:1-1970:4	51.0	1960:2-1969:4	50.4
1970:4-1975:1	12.7	1969:4-1973:4	16.2
1975:1-1980:3	20.5	1973:4-1980:1	19.3
1980:3-1982:4	1.6	1980:1-1981:3	2.1
1982:4-1991:1	35.4	1981:3-1990:3	33.7
1991:1-2001:4	43.1	1990:3-2001:1	41.1
2001:4-2009:2	17.7	2001:1-2007:4	17.8
Mean	22.8		22.6
Median	19.1		18.5

Problem 5.6: There are four hypothesis indicated in the question:

- A. big expansions are followed by big recessions (and small by small): *correlation #1 should be positive.*
- B. big recessions are followed by big expansions (and small by small): *correlation #2 should be positive.*
- C. small recessions are followed by big recoveries (and big by small). *correlation #2 should be negative.*
- D. expansions and recessions are essentially uncorrelated: *both correlations should be small.*

The evidence:

correlation #1 (expansion and the subsequent recession) = -0.69

correlation #2 (recession and the subsequent expansion) = -0.17

The interpretation of this evidence (an essential part of the answer) is left to the student.

Problem 5.8: There are different ways to approach this question. Here is one way: Canadian recessions were identified using a modified two-quarter rule (see Table 5.8.1):

Canadian Recession Dates (2-quarter rule)	U.S. NBER Recession Dates
1957:3-1958:1 ¹	1957:3-1958:2
	1960:2-1961:1
	1969:4-1970:4
	1973:4-1975:1
1980:1-1980:3	1980:1-1980:3
1981:2-1982:4	1981:3-1982:4
1990:1-1991:4	1990:3-1991:1
	2001:1-2001:4
2007:4-2009:2 ²	2007:4-2009:2*

Notes: ¹While the start date follows the strict 2-quarter rule, there is an ambiguity about the actual start date of this recession, since it falls just at the beginning of the time-series.

²A strict 2-quarter rule would place a trough at 2008:2 and a peak at 2008:3 (a one quarter recovery!). Since the value at 2008:3 does not reach the level of the earlier peak, the whole period is counted as single recession.

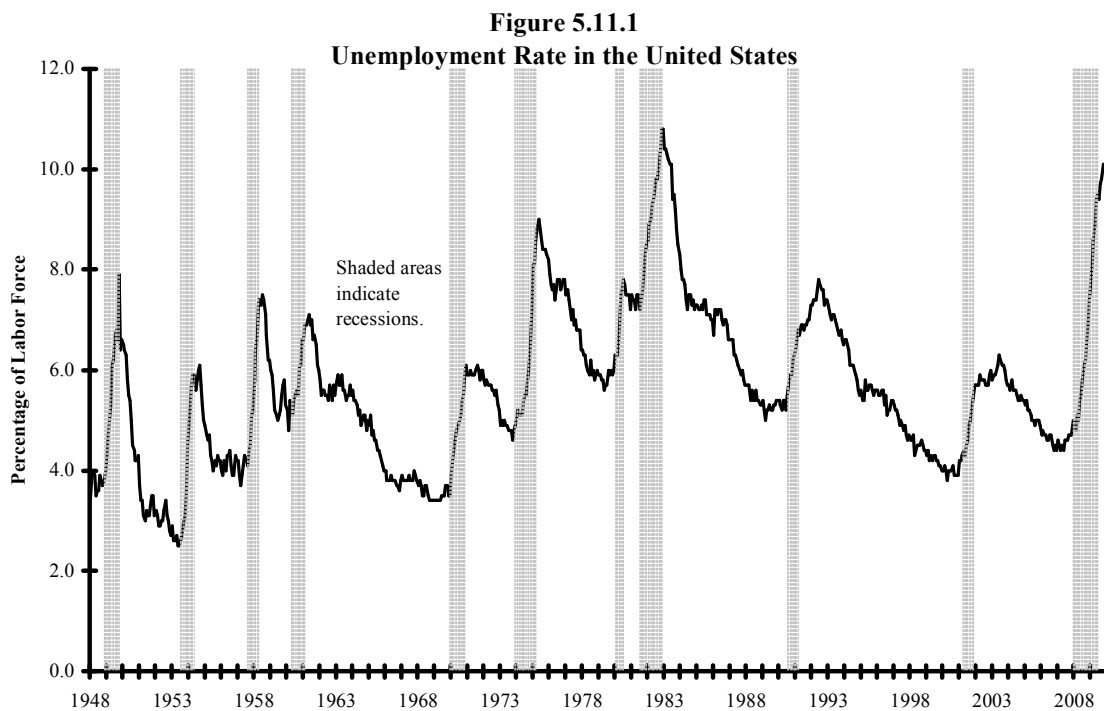
Table 5.8.2. Characteristics of the Canadian Business Cycle

	Recessions		Expansions	
	Change in GDP (percent)	Duration (quarters)	Change in GDP (percent)	Duration (quarters)
mean	-2.6	4	67.7	47
median	-3.4	4	49.3	48

Tables 5.8.1 and 5.8.2 show that Canada has had fewer business cycles than the United States. Its recessions seem to be typically deeper than those in the United States and its expansions larger in terms of GDP (compare answer to Problem 5.3). Comparing to Table 5.1, the duration of its recessions is just about the same as those in the U.S. while the duration of its expansions (about 12 years on average) is longer (U.S. about 4¾ years in the post-World War II period). During the period since 1957, every Canadian recession has a close U.S. counterpart (see Table 5.8.1). However, the U.S. has four recessions that have no Canadian counterpart. Note, however, that the U.S. recession of 1960:2-1961:1 does not fit the 2-quarter rule, and Canadian GDP does fall in 1960:2 and again in 1961:1. Also, the U.S. recession in 2001:1-2001:4 is the anomalous case in which GDP actually rises during an NBER recession. So, all in all, it looks as if the Canadian business cycle is closely, but not perfectly linked to the U.S. business cycle – as one might expect for two such closely integrated economies.

(An additional note on the two U.S. recessions in 1969:4-1970:4 and 1973:4-1975:1. The first was associated with rising commodity prices and the second with the first oil crisis following the Yom Kippur War in 1973. Canada is a major commodity and, especially, oil exporter. So these events, which were negative for the U.S. economy, were likely positive for Canada, which may account for the divergence of the two business cycles at that juncture.)

Problem 5.11: There are a variety of ways to approach this question. One way is graph the unemployment rate against the NBER recession dates as shown in Figure 5.11.1. The figure indicates that the cyclical nature of the unemployment rate has changed. Before the mid-1980s, unemployment is very nearly a coincident indicator reaching its lowest point close the peak of the business cycle and its high point almost exactly at the trough. Since then, however, it has been a leading indicator of the peak and a lagging indicator of the trough.



Problem 5.12: Figure G.12 shows that the time series of the growth rate of level series that follows a sine wave is itself a wave advanced a quarter cycle: that is, the trough of the growth-rate series occurs between peak and subsequent trough of the level series and the peak of the growth-rate series occurs between the trough and the subsequent peak of the level series. Figure 5.12.1 shows the actual series for the growth rate of GDP plotted against the NBER recession dates. It roughly conforms to Figure G.12. The troughs of the GDP growth rate series typically occur within the recession (that is, between the NBER peak and trough), and the peak occurs in the NBER expansion (that is, between the NBER trough and peak) – both are just as predicted by Figure G.12, though far more rough-and-ready.

Figure 5.12.1. GDP Growth Rates and the Business Cycle

