

Chapter 9 Selected Answers

Problem 9.2:

- (i) GDP falls from \$13,212 billion to \$12,859 billion or 3.4 percent;
- (ii) labor productivity decreases from \$50.61 per hour to \$48.89 per hour or 3.4 percent;
- (iii) capital productivity rises from \$0.33 GDP per dollar of capital to \$0.36 GDP per dollar of capital or 7.3 percent.

Problem 9.5: Table 9.5.1 presents the growth rates of three measure of productivity.

The growth rate of capital productivity is negative and small in absolute value, which suggests that capital productivity has very little trend. The growth rate of labor productivity is large (doubles in about 37 years). Total factor productivity is the weighted average of capital and labor productivity; so its growth rate must fall between the other two (as it, in fact, does). The table shows that the increase in total factor productivity (doubles in about 57 years) is attributable to the increase in labor productivity and not to the increase in capital productivity.

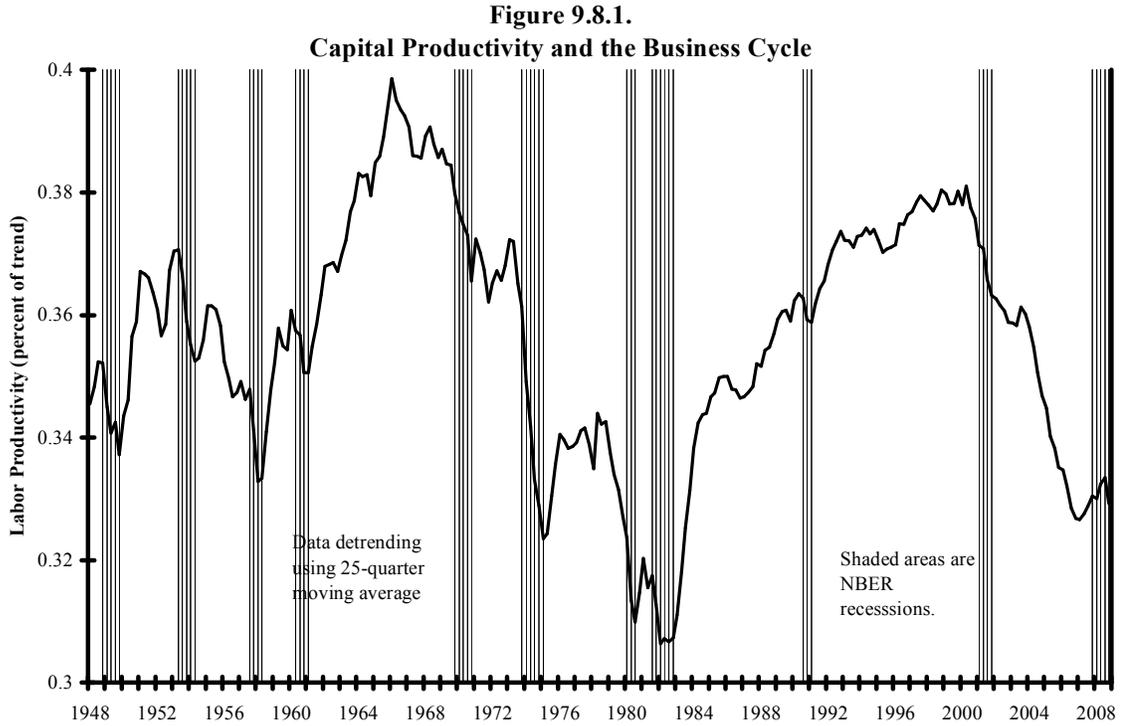
Table 9.5.1
Productivity Growth Rates

Average Rate of Growth (percent per year) of:		
Labor (θ)	Capital (ϕ)	Total Factor (A)
1.74	-0.12	1.12

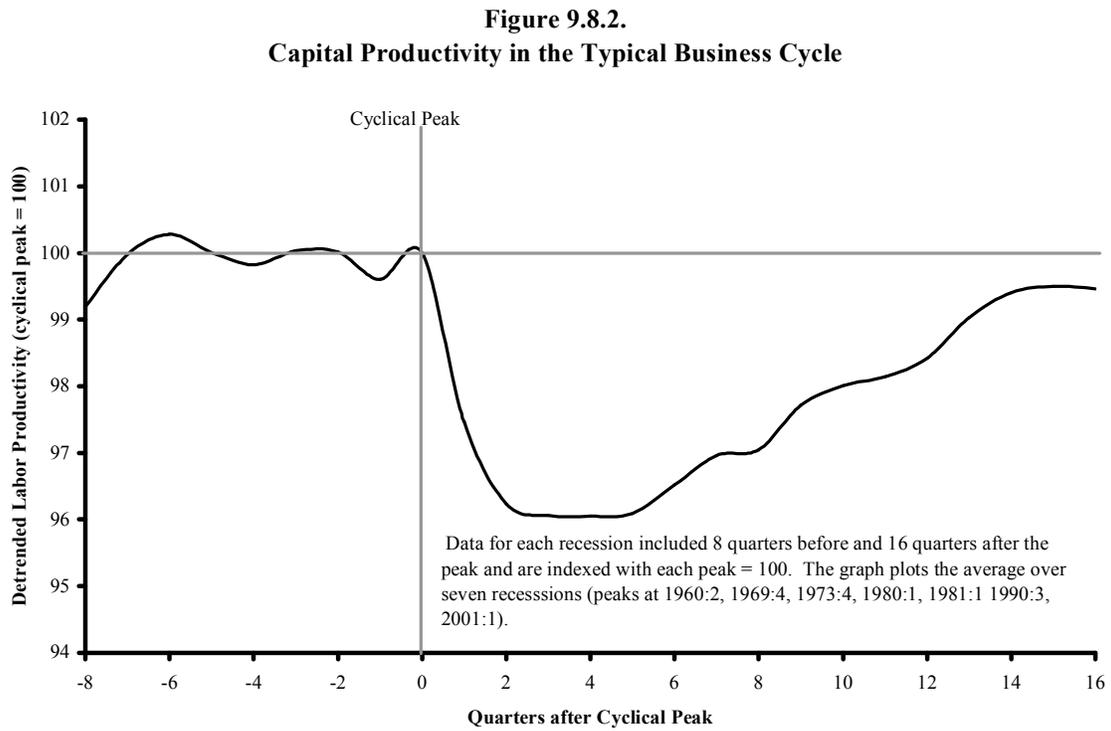
Problem 9.8.

- (a) *Conjectures will vary with students. Here is one: capital is likely to be used more intensively as expansions continue.* Pressure on existing capital stocks raise the incentive to invest in new capital. As new capital is brought on line is it likely to be used somewhat less intensely than the old capital – closer to its optimal operating rate. Furthermore, it is likely that, because of lack of coordination among firms, more capital will be purchased than justified by the current demand. Thus, again, the capital stock is less likely to be used as intensely as early in the boom. We should, therefore, expect capital productivity to peak sometime during the expansion and then to fall back somewhat. When a recession arrives, much of the capital stock will remain idle, and thus capital productivity should fall sharply, only to recover as demand recovers after the trough of the recession.

(b)



(c)



(d) Figure 9.8.1 shows that capital productivity falls in every recession and rises in every expansion, reaching a peak well before the cyclical peak. Figure 9.8.2 confirms this pattern, showing that on average the peak in capital productivity occurs 6 quarters before the cyclical peak. The fall in productivity is gentle until the cyclical peak is reached and then is precipitous. Capital productivity begins to recover about a year after the cyclical peak, which is about the average length of post-World War II recessions.

Problem 9.10. Figure 9.10.1 shows that the long-run behavior of the calculated index and the official BLS index are very similar – both in trends and variations. The latter is confirmed by the correlation between the annualized quarterly rates of growth of the two series: 0.62. This is a moderate, but not high correlation. The difference between series is in part that the BLS series is based on detailed data from individual firms, whereas the calculated data uses only aggregate data; and in part because the BLS data is not a measure of productivity in the whole economy, but only in the business sector, which omits government and nonprofit employment.

Figure 9.10.1.
Two Measures of Labor Productivity

