

1 Answer Keys for Homework 7

1.1 Exercise 1:

Yearly growth rates in GDP for US, Japan and EU are displayed below. The table is based on Figure 4.7 in the book.

(Here: Table 1; see a separate EXCEL document on the web page.)

Using the formulas,

$$\text{Corr}(\text{US}, \text{Japan}) = -0.67$$

$$\text{Corr}(\text{Japan}, \text{EU}) = 0.683$$

$$\text{Corr}(\text{US}, \text{EU}) = 0.379$$

1.2 Exercise 2:

The definition of "leading variables" and why are used in forecasting recessions and booms can be found in page 93, in the book.

The Random Walk Theory justifies the use of a "lagging variable" to forecast booms and recessions. Be sure to understand why. Page 103 of the book gives details and intuition.

1.3 Exercise 3:

No. Capital utilization and labor hoarding are also procyclical. Multifactor productivity (A_t) can change even though technology does not. For example, in a recession firms would not want to use capital at full capacity. Since A_t is calculated as a residual, a negative change in A could be found without a change in technology. The same reasoning applies to labor hoarding.

1.4 Exercise 4:

After a technology shock, consumption tends to change by a smaller percentage than output while investment tends to change more than output in percentage terms. Hence, investment is more volatile than consumption. The *accelerator*

theory and *consumption smoothing* help explain why. Looking at page 107 will be useful to develop a complete answer.

1.5 Exercise 5:

From page 9 we know that:

$\Delta K = I + D$, where I is the *gross investment*. Using the model of chapter 3 and solving,

$I_t = K_{t+1} - (1 - \delta)K_t = (1 - \alpha)A_t(1 - \beta)K_t^\beta - (1 - \delta)K_t$. Using this expression, it is possible to show that volatility of investment will be increasing in the depreciation rate only if the economy is growing (i.e. $K_{t+1} > K_t$).

1.6 Exercise 6: