

Homework 7

1. Calculate the correlation between the yearly growth rates in GDP for the U.S., Japan, and the European Union, using the 1988–1996 data in Figure 4.7 in the book. A correlation coefficient between two variables x and y , with n observations, is computed as

$$\frac{\frac{\sum(x-\bar{x})(y-\bar{y})}{n}}{s_x s_y},$$

where s_x and s_y are the standard deviations of x and y , respectively. The standard deviation of the variable x is computed as

$$\sqrt{\frac{\sum(x-\bar{x})^2}{n}},$$

and similarly for y .

2. In order to forecast coming recessions and booms, why are “leading variables” used? Explain what such a variable is. Could a “lagging variable” be used to forecast recessions and booms, too?
3. Recall the growth accounting exercises from Chapter 1, and the homework associated to it. Multifactor productivity, A in our model, as measured using growth accounting, is procyclical: it correlates positively with the output. Is this evidence that technology shocks are the fundamental cause of business cycles? In your answer, comment on the possible role of labor hoarding and capacity utilization.
4. Why is investment more volatile than consumption?
5. Using the growth model from Chapter 3, explain how the volatility of (gross) investment is larger or smaller depending on the rate of depreciation.
6. A NIPA exercise: consider an economy with two fishermen, two fish wholesale companies, and one restaurant. Fisherman S specializes in salmon, and fisherman C in cod, but C also works extra now and then for S helping him with salmonfishing. Both S and C are sole proprietors. Wholesaler SS only trades in salmon and wholesaler CC only trades in cod; these are both incorporated. Finally, a restaurant buys fish from both wholesalers and serves fish meals to happy customers. The data is as follows: the fisherman-to-wholesaler prices of salmon and cod are \$2 and \$3 per pound, respectively, and S caught 1000 pounds of salmon and 10 pounds of cod, whereas C caught 500 pounds of cod and 100 pounds of salmon. For his help, C was paid \$200 in wages by S. The wholesale prices of salmon and cod are \$3 and \$4 per pound, respectively. A restaurant meal including 1 pound of salmon costs \$10 and a meal with 1 pound of cod costs \$15. S pays \$500 per year for renting a boat from C; C owns two boats, rents one out to S as part of his business, and pays \$500 per year in interest and \$200 in mortgage to the bank for a \$2000 loan he took to buy the boats. The wholesalers pay

salaries of \$50 each, plus costs for ice used for storage amounting to \$40 dollars each; the ice is made in ice machines, and each wholesaler owns one. Wholesaler SS also pays \$10 in rent for storage space; CC owns the building it stores its fish in and does not pay rent. Finally, the restaurant pays wages of \$500, and rent of \$500. Calculate GDP in the three different ways.