

Investment Demand
Additional Homework Problems
 ECON 3133
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Answers

1.

- a. $K^* = 400$; $I = 0.25 \times (400 - 400) = 0$.
 b. $K^* = 500$.

Given K^* , actual investment is calculated as $I = s \times (K^* - K_{-1})$.
 Given I , capital stock this period equals $K = I + K_{-1}$.

Year	K_{-1}	I	K
2	400	25	425
3	425	19	444
4	444	14	458

Long-run levels: $K = 500$; $I = 0$.

Investment reacts with a lag because of the value of s in the investment function; s is less than 1.

c.

Year	I
1	0
2	100
3	0
4	0

$s = 1$ means that investment takes capital immediately to the desired level, rather than gradually as above.

2.

- a. $K^* = 400$; $I = 40$.
 b. Given K^* , actual investment is calculated as $I = s \times (K^* - K_{-1}) + 0.1 \times K_{-1}$.
 Given I , capital stock this period equals $K = I + K_{-1} - 0.1 \times K_{-1}$.

Year	K_{-1}	I	K
2	400	65	425
3	425	61	444
4	444	58	458

- c. Given K^* , actual investment is calculated as $I = (K^* - K_{-1}) + 0.1 \times K_{-1}$.
 Given I , capital stock this period equals $K = I + K_{-1} - 0.1 \times K_{-1}$.

Year	K_{-1}	I	K
2	500	140	500
3	500	50	500
4	500	50	500

3. Buffer stock theory says a big boom in GDP may catch business by surprise, so inventory investment is negative. Pipeline theory says a big boom in GDP requires an increase in work-in-progress inventories. A sudden decline in GDP will lead to positive inventory investment according to the buffer stock theory, due to unanticipated inventory buildup, and negative investment according to the pipeline theory.

4.
 - a. In order for the rental price of capital not to change, it must be the case that $(R + \delta_K) \times 110 - \Delta P_k = (R + \delta_K) \times 100$, or $\Delta P_k = 10 \times (R + \delta_K) = 1.5$. Thus, the firm must expect the price of capital to be 111.5 next year.

 - b. In the year of the price increase the desired capital stock falls since the rental cost of capital increases from 15 to 26.5. If the capital stock adjusts immediately, then there will be negative net investment in the year of the price increase. The following year, the cost of capital and the desired capital stock will return to their original levels, and there will be a positive level of investment equal in magnitude to the negative level of investment of the year before. In all subsequent years, investment will be zero. If the capital stock adjusts with a lag, then investment in the first year will be negative in the first year (though less so than in the previous case), then positive in the second and all subsequent years, and only gradually approach zero. The capital stock will fall, and then gradually return to its original level.

5. The profit maximizing firm sets the marginal product of capital (MP_K) equal to marginal cost (i.e., rental price) of capital (R_K). Currently, $K = 6$ so the $MP_K = 36 - 3 \times K = 36 - 18 = 18$, while $R_K = (R + \delta) \times P_K = (0.06 + 0.10) \times 75 = 12$. Since $MP_K > R_K$, the firm should increase its capital stock until the $MP_K = R_K = 12$. Thus, the firm should raise its capital stock (K) to 8 (i.e., solve the equation: $36 - 3 \times K = 12$, for K).

6. Depreciation on an automobile is substantial; the rental cost of capital of automobiles will not be sensitive to the interest rate as say the rental cost of capital for housing. On the other hand, there is virtually no delay in the adjustment by consumers of their actual auto stocks to their desired auto stocks. The first point argues against auto demands being especially sensitive to the interest rate; the second point argues for it. The effect of demand on production, and hence of the interest rate on production, will depend on the extent to which manufacturers use inventories to meet changes in demand.

7. The decrease in taxes on consumers will stimulate consumer spending, raise output, and increase investment via the accelerator. On the other hand, the increase in business taxes will reduce the desired capital stock at any level of income. Because adjustments to the capital stock occur with a lag, the net effect in the short run should be to increase investment demand. In the long run, as output returns to potential, investment should be lower than it otherwise would have been due to the higher cost of capital.

8. If the government typically increases incentives for investment (i.e., raising the amount of the investment tax credit) during recession, firms' may expect that the government will do the same at the beginning of future recessions. As a result, firms will likely postpone some investment at the beginning of a recession and instead wait for the government to enact additional incentives to increase investment. This action will enhance the decline in real GDP at the beginning of a recession.