Test Bank for Personnel Economics 1st Edition by Kuhn

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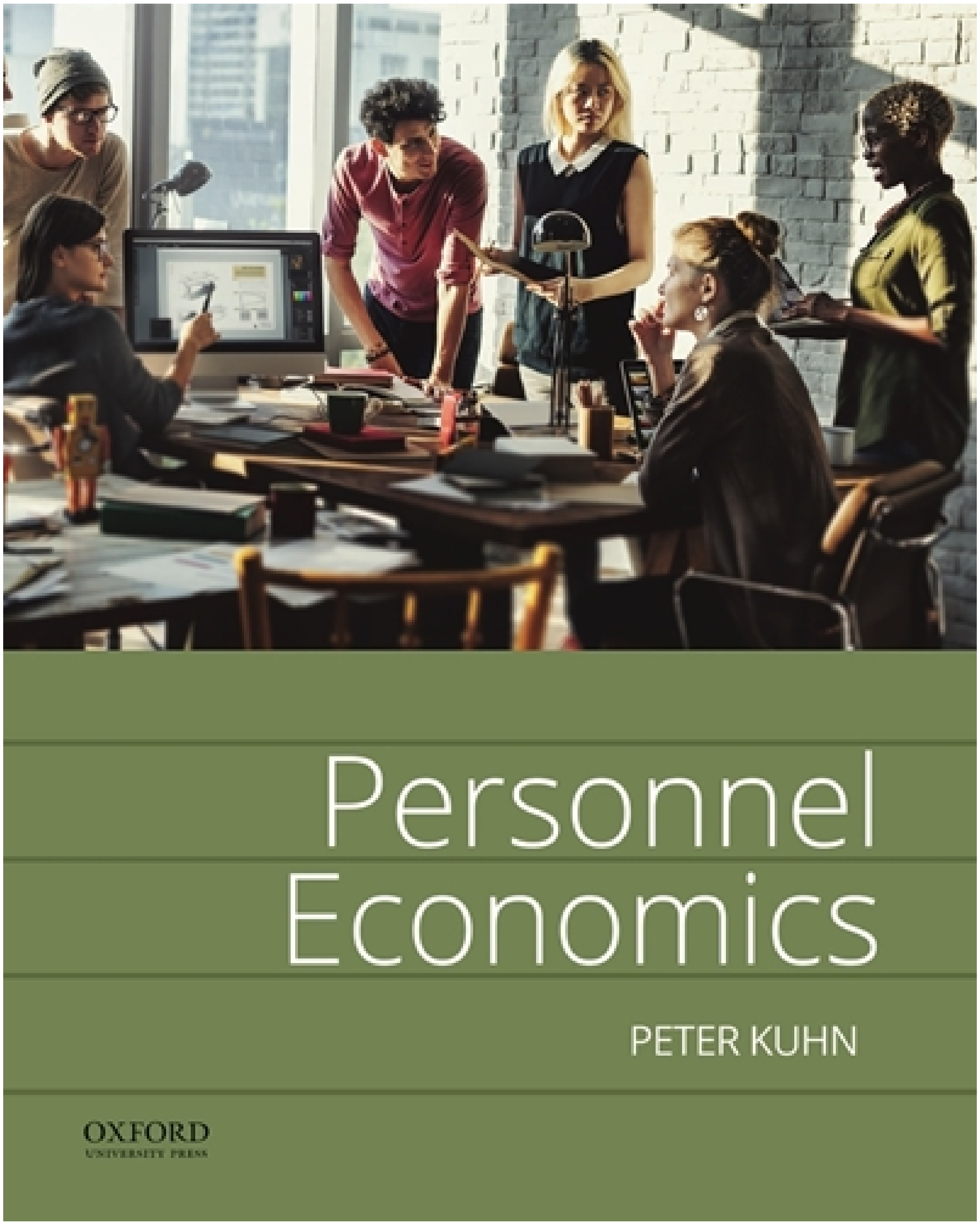


Test Bank

CHAPTER 2—Solving the Agent's Problem

1. *Suppose $V(E) = E^2$ instead of $E^2/2$. What is the agent's optimal effort when $d = 1$?*

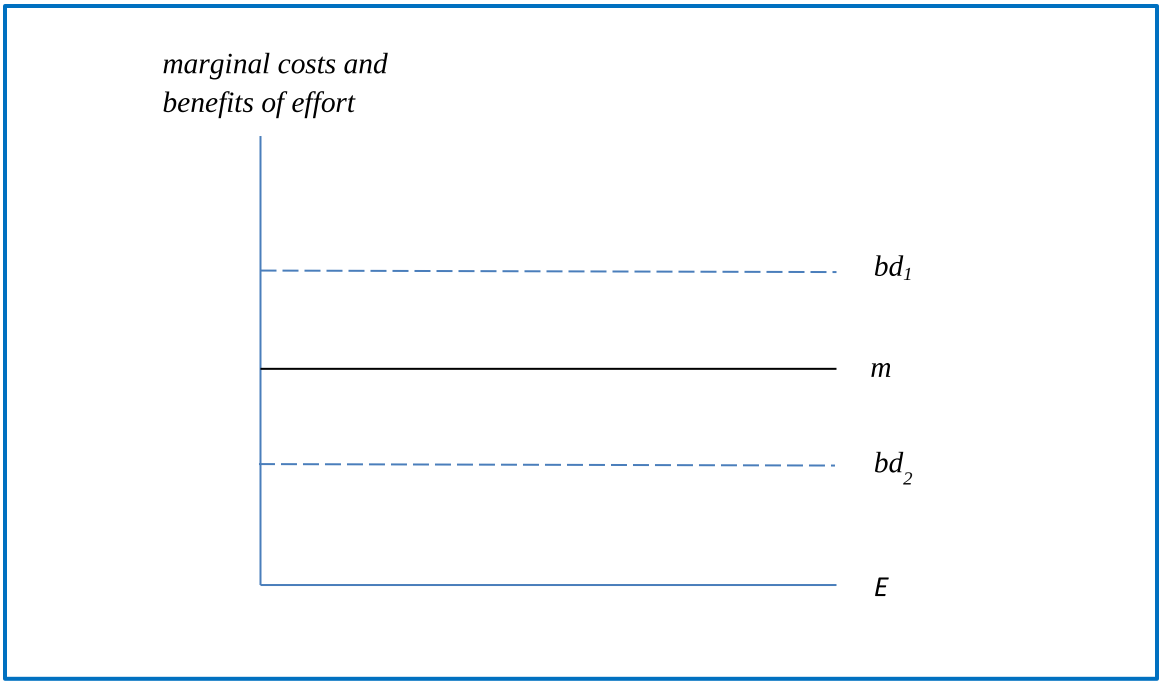
When using $V(E) = E^2$ instead of the baseline effort cost function, the agent's optimal effort changes. The agent's utility can still be written as: $U = Y – V(E) = (a + bdE) – V(E)$. When solving the maximization problem we take the derivative of U with respect to E and set it equal to zero yielding $bd – V'(E) = 0$ or $V'(E) = bd$. Since $V'(E) = 2E$ and $d = 1$ it gives us $E^* = b/2$. The agent's optimal effort, E, thus equals $b/2$. Raising the slope parameter (b) still makes the agent work harder and changing the intercept parameter (a) of the employment contract still has no effect on the agent's optimal effort level just like the baseline case.

2. *Suppose $V(E) = E^3/3$ instead of $E^2/2$. What is the agent's optimal effort when $d = 1$? Hint: you'll need to use a tiny bit of calculus, that is, the derivative of E^3.*

Following the same procedure as in question 1, we solve the agent's maximization problem by taking the derivative of U with respect to E and set it equal to 0. Since $V'(E)$ is now equal to $V'(E) = E^2$ the agent's optimal effort when $d = 1$ thus equals $E^* = \sqrt{b}$. Raising the slope parameter (b) still makes the agent work harder, but now his marginal effort responses are decreasing as b rises. Changing the intercept parameter (a) of the employment contract still has no effect on the agent's optimal effort level.

3. *Suppose that instead of increasing marginal costs of effort, the marginal costs of effort were constant; for example, suppose that $V(E) = mE$, where $m > 0$. What is the agent's optimal effort when $m < bd$ or when $m > bd$?*

Now the marginal costs of efforts are constant: $V'(E) = m$, which does not depend on E. Thus it is impossible to compute the agent's optimal effort by setting marginal benefit (bd) equal to marginal cost (m). To see how the agent should behave in this situation it is most revealing to draw a diagram.



When $m < bd$ (the case of bd_1), the agent gains bd_1 from each unit of effort he provides, which is higher than the costs of providing the effort. Since he reaps this gain on every unit (even the gazillionth), his optimal effort level is infinity, or the highest possible. By the same reasoning, optimal effort is zero (or the lowest possible) when $m > bd$.

We get these "extreme" solutions here because the agent has constant, instead of increasing marginal costs of effort. Since these results are unrealistic, we usually assume increasing marginal costs of effort, i.e. we assume that $V'(E)$ is increasing in E, or $V''(E)>0$.