Answers to Chapter 1

• Review Questions

1. **Answer d.** In product markets, firms sell and individuals buy. Also, human beings are not as intimately involved in the transactions, so nonpecuniary factors are less important.

2. **Answer d.** If people strive to make themselves as happy as they can (i.e., maximize their utility), and a human being is "attached" when labor market transactions take place, it seems likely that feelings, emotions, personalities, and working conditions will play a role in determining the nature of these transactions. All these factors seem to play an important role in determining a human being's happiness.

3. **Answer b.** This is the only statement that refers to "what is" true about the labor market. All the others, either explicitly or implicitly, make reference to "what should be" true about labor market outcomes.

4. **Answer a.** This statement makes reference to "what should be," while all the others refer to how labor market variables are actually linked.

5. **Answer a.** A model is useful precisely because it is abstract. If it accurately captured all of the complexity of the real world or people's actual thought processes, it would be so intricate that no patterns or principles could be discerned. Models can be used not only to predict behavior but also to illustrate the kind of behavior that should take place to reach certain goals.

6. **Answer d.** Individuals or households are assumed to maximize utility, while firms are assumed to maximize profits.

7. **Answer d.** The two most fundamental assumptions of positive economics are scarcity (people cannot get everything they want) and rationality (people consistently weigh costs and benefits).

8. **Answer c.** Utility maximization means people strive to be as happy as possible, and that happiness may depend in part on how other people are doing, not solely on an individual's own circumstances. The concept of mutually beneficial transactions is a normative one, unrelated to what actually happens in some instances. Positive models refer to actual links between economic variables, and these links can only be exposed by holding other factors constant.

9. **Answer b.** The test of a positive economic model is how well it predicts average tendencies. It does not have to capture everyone's idiosyncrasies all the time. Normative models, on the other hand, relate to standards that someone feels should be attained.

10. **Answer b.** Normative statements are frequently connected to mandated transactions, not just voluntary transactions. These mandates can be driven by the quest for mutually beneficial gain, but they need not be. Other ethical principles or goals like fairness may be the driving force behind normative statements.

11. **Answer d.** If one person gains and no one else loses, that is a transaction that seemingly could be supported by unanimous consent. Therefore, if such a transaction can still be made, a Pareto efficient outcome has not been achieved.

12. **Answer b.** In most situations there are many different Pareto efficient outcomes, but many of these outcomes would probably be considered unfair. The outcome that is finally achieved may be arrived at voluntarily or by government mandate.

13. **Answer d.** Moving from one Pareto efficient outcome, even if it is to another Pareto efficient outcome, will make one person worse off at the same time it makes someone else better off. Deciding among Pareto efficient outcomes, therefore, involves some assessment of the fairness or equity of the outcomes. These judgments have traditionally been made in the political arena and are often influenced by each party's initial income or wealth position. Most political systems have been willing to support at least some redistribution of wealth from the rich to the poor.

14. **Answer d.** Other reasons include price distortions caused by government taxes or the lack of a market where the transaction can be worked out.

15. **Answer d.** Also, in some instances, government action is the impediment to the Pareto efficient outcome. In these instances the government must get out of the way before the transaction can be completed.

16. **Answer c.** Least squares regression makes no assumptions with respect to the relationship between independent variables (those on the right side of the equation) or the size of the coefficients attached to these variables. For the estimated parameters to be unbiased estimates of the true values, however, the error term must be random.

17. **Answer b.** One can reject the hypothesis that the true value of a particular coefficient is zero only if the estimated parameter is more than twice the size of its standard error (the *t*-statistic will then be greater than 2). A small standard error is no guarantee of a non-zero parameter if the estimated parameter is also very small. A random error term helps to ensure that the estimates are as precise as possible, but the existence of a random error term does not have any bearing on the existence of a relationship between the independent and dependent variables.

18. **Answer b.** A coefficient in a multiple regression indicates the effect on the dependent variable, on average, of a one-unit change in the independent variable, assuming the other variables are held constant. A non-zero estimate for the coefficient does not ensure that the true value of the parameter is different from zero. In this case, however, a parameter estimate four times as large as its standard error allows us to reject the hypothesis of a "true" value of zero.

19. **Answer d.** The relatively small value of the standard error means the coefficient on the *W* variable has been measured with a relatively small margin of error. Also, since the coefficient is 2.5 times its standard error, the hypothesis that the true value of the coefficient is zero can be rejected. However, a relationship that is significant in a statistical sense is not necessarily significant in an economic sense. Holding all else constant, in this equation, every $1 increase in the wage is accompanied by just a one-half hour reduction in total annual hours, a very insignificant amount.

20. **Answer a.** Since *W* and *V* are positively correlated, the coefficient on *W* would pick up some of the negative effect *V* exerts on *H*, making the coefficient on *W* smaller.

• Problems

21a. The drawing is a model because it is a deliberate abstraction designed to illustrate certain key characteristics of human beings.

21b. The model highlights that human beings walk upright on two legs. It also highlights the relative size of the head and limbs. It pushes all the details of our appearance, particularly things like the shape of our hands and feet, into the background. It also says nothing about the mental capacities that distinguish us from other animals. There are, of course, other characteristics that it doesn't capture either.

21c. A simple drawing was easy to make. Anything more involved would require some artistic skill. Also, such a simple drawing highlights the idea that models are abstract. A more realistic drawing would not have gotten across the idea that "humans walk upright on two legs" any better than this simple drawing. In fact, a more realistic drawing might have obscured this point by focusing attention on other features.

21d. This is a positive model since it attempts to show "what is" true about human beings. It does not attempt to assess our bodily design or illustrate "what should be."

22a. The person is being inconsistent. If it is worth taking 30 minutes to save $5 in the first situation, it should also be worth it in the second situation. However, he may be acting like this because the percentage savings is much smaller in the second case. Studies of perception have revealed that the larger or more intense the stimulus (in this case the original expenditure on insurance), the larger any change (in this case the cost savings) has to be before it will be recognized.

22b. No, a model with poor predictive power may still be useful in a normative sense, in this case as a guide to more rational decision making. In this example, if confronted with his inconsistency, the worker may realize that his choice in the second instance was obscured by the large dollar amounts. As a result he may be able to avoid similar mistakes in the future.

23a. The outcome is Pareto efficient because there is no way any of the remaining firms or workers can reach an agreement that is mutually beneficial. For example, firm 9 will only benefit from a wage below $360, but worker 9 will not benefit from anything below $400. Since all the mutually beneficial deals have already been made, the outcome is Pareto efficient.

23b. With deals below $480 prohibited, only firms 1, 2, and 3 will be interested in hiring. On the other hand, all 10 workers would be willing to work. Suppose for simplicity that workers 1, 2, and 3 are hired. Worker 4, who has been shut out of the market, could easily strike a mutually beneficial deal with firm 4 by offering to work for, say, $400, but the law prohibits this. Since mutually beneficial deals can still be made, the outcome under the legislated wage is not Pareto efficient.

23c. The three workers who continue to be hired each gain $100 (the difference between the legislated wage of $480 and the wage of $380 that would have emerged if all mutually beneficial trades were allowed). The three firms that hire them each lose $100 relative to what they would have gained under the lower wage. The five workers who would have been hired under the lower wage also lose. Assuming workers 4 through 8 have been shut out, the total loss to these workers is $200 ($80 + $60 + $40 + $20). Combining the worker and firm losses yields a total loss of $500.

23d. The winners do not gain enough ($300) to compensate the losers (–$500) and still come out ahead. Such a law can only be justified using principles developed outside of economics. For example, those who gain might have been very poor to begin with, while those who lost might have been well off. In such a situation, the redistribution might be justified by appealing to notions of equity or fairness.

23e. Eight workers would be hired, the same outcome as in **23a**.

23f. This is a Pareto efficient outcome since no mutually beneficial deals still exist. Even if person 9 were paid his minimum acceptable wage of $400, the firm would not gain by hiring him. While the outcome is Pareto efficient, it is not necessarily equitable since the firm has reaped all the benefits.

24a. See the scatter of points in Figure 1-2.

24b. See the straight line in Figure 1-2.

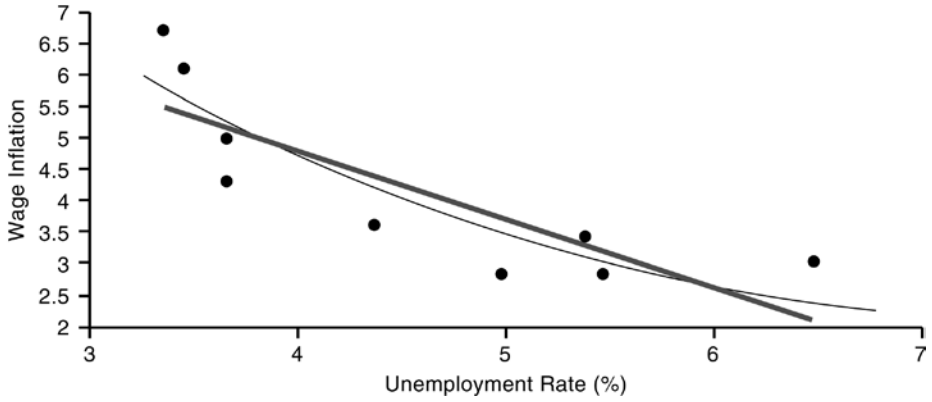

Figure 1-2

*24c. See Table 1-5 and the points plotted as squares in Figure 1-3.

Table 1-5

UR	Actual $\%\Delta W$	Predicted $\%\Delta W$	Residual
5.4	3.4	3.3	0.1
6.5	3.0	2.1	0.9
5.4	3.4	3.3	0.1
5.5	2.8	3.2	–0.4
5.0	2.8	3.7	–0.9
4.4	3.6	4.4	–0.8
3.7	4.3	5.2	–0.9
3.7	5.0	5.2	–0.2
3.5	6.1	5.4	0.7
3.4	6.7	5.5	1.2

*24d. The residuals do not seem random. They tend to be positive when the unemployment rate is relatively high or relatively low, and negative otherwise. From the scatter of points in Figure 1-2, it appears a convex curve would fit the data better.

*24e. See the solid curve in Figure 1-2.

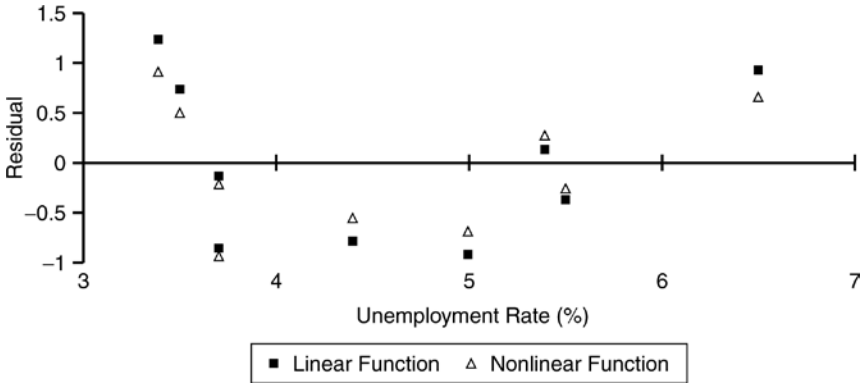

Figure 1-3

*24f. See Table 1-6 and the points plotted as triangles in Figure 1-3. For six of the ten years the fit improved. There were two years where it worsened slightly and two years where it was essentially unchanged. The fit improved most at the lowest and highest values of the unemployment rate. For both values, the residual was 0.3 units less when the nonlinear function was used.

Table 1-6.

UR	Actual $\%\Delta W$	Predicted $\%\Delta W$	Residual
5.4	3.4	3.1	0.3
6.5	3.0	2.4	0.6
5.4	3.4	3.1	0.3
5.5	2.8	3.0	–0.2
5.0	2.8	3.5	–0.7
4.4	3.6	4.2	–0.6
3.7	4.3	5.2	–0.9
3.7	5.0	5.2	–0.2
3.5	6.1	5.6	0.5
3.4	6.7	5.8	0.9

24g. See the scatter of points in Figure 1-4.

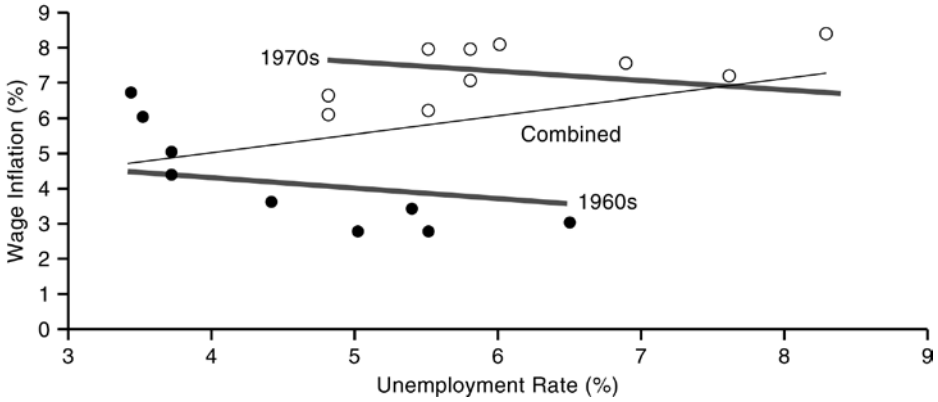

Figure 1-4

24h. See the lines labeled “1960s” and “1970s” in Figure 1-4. The 1970s line lies 3.7 units above the 1960s line at every value of the unemployment rate.

24i. See the line labeled “Combined” in Figure 1-4. The omission of the *D*70 variable severely biases the coefficient on the unemployment variable in an upward direction. The *D*70 variable normally would exert a positive effect on the dependent variable. However, since *D*70 and the unemployment rate are positively correlated (notice that both unemployment and inflation were higher in the 1970s), when the *D*70 variable is omitted, most of its positive effect on the dependent variable will be attributed to the unemployment rate variable. Notice that omitting a variable is a problem here because the omitted variable and the remaining variable are correlated. Omitting a variable that is not correlated with the independent variable would not create bias in the estimated coefficient.

*24j. To allow both the position and slope of the curve to be different, estimate the equation

$$\%\Delta W_t = a_0 + a_1 UR_t + a_2 D70_t + a_3 D70\ UR_t + e_i.$$

For the 1960s, the vertical intercept would be given by the estimate of a_0, while for the 1970s it would be given by $a_0 + a_2$. Similarly, for the 1960s, the slope would be given by the estimate of a_1, while for the 1970s it would be given by $a_1 + a_3$.

• Applications

25a. The notion of exercising a preferential option for the poor is very different from promoting the norm of Pareto efficiency. Under Pareto efficiency, only mutually beneficial changes should be undertaken. But when exercising a preferential option for the poor, some parties may be called upon to sacrifice so that the poor can advance.

25b. When the goal is to promote Pareto efficient outcomes, the government mainly plays a facilitating role. Its task is to promote voluntary exchange based on accurate and complete information. When barriers to such transactions exist, however, the government sometimes can act in a way to overcome these barriers. Some examples of these actions include providing for the production of public goods, eliminating capital market imperfections, or establishing substitutes for the market.

Pope Leo XIII sees the task of government as promoting and protecting the interests of the poor and disadvantaged. Government need not act on behalf of all members of a society. Rather, government actions must be judged by their impact on the poor, even when these actions require sacrifice by others.

26a. The survey suggests people care about where their income stands relative to others in the population.

26b. The norm of Pareto efficiency says that all mutually beneficial changes should be undertaken. In this case, many people disagree that the program should be enacted, even though everyone gains. Therefore the responses are inconsistent with the norm of Pareto efficiency.

26c. It appears that the premise of the question would have to have everyone gaining by roughly the same amount for the reform to be supported unanimously.

27a. Estimating the parameters α_0 and α_1 would require cross-sectional data on earnings and employee-generated revenues for a number of workers at one or more firms. Estimates of the parameters would be derived by choosing values for α_0 and α_1 such that the squared differences between the actual and predicted values of employee earnings were minimized. Most statistical and spreadsheet programs have commands that will use this criterion to find the parameter estimates.

27b. The precision of an estimate is indicated by its standard error. If the estimated parameter is approximately twice the value of its standard error, it is possible to reject with reasonable confidence the hypothesis that the true value of the parameter equals zero.

*27c. If the hypothesis is that parameter α_1 equals one, rather than zero, then the value of the estimated parameter, minus one, must be approximately twice the standard error of estimated parameter.

*27d. Frank's hypothesis implies that the relationship between earnings and productivity is much flatter than the standard theory predicts. For a graphical depiction of this effect, see Figure 1-5. Line *ab* represents the relationship between *E* and *R* implicit in the standard model, while line *cd* would be consistent with Frank's hypothesis. Consequently, the prediction would be that α_0 would be much greater than it is in the standard model, while the value of α_1 would be much less (and definitely less than one).

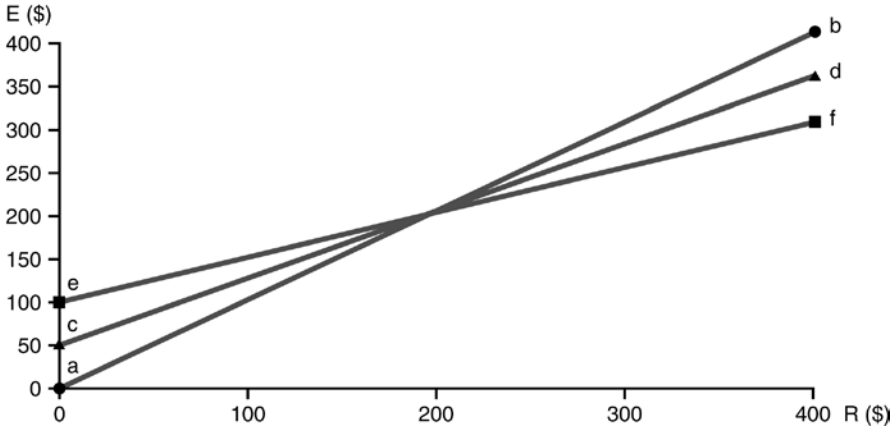

Figure 1-5

*27e. The equation to be estimated is

$$E_i = \alpha_0 + \alpha_1 R_i + \alpha_2 D_i + \alpha_3 D_i R_i + e_i.$$

This equation allows both the intercept and slope to change as the degree of employee interaction increases. Since the hypothesis is that relationship between earnings and productivity flattens out as the degree of interaction increases, the expectation would be that the estimate of the parameter α_2 would be greater than zero and the estimate of the parameter α_3 would be less than zero. The effect of increased interaction is also shown in Figure 1-5. Line *cd* represents a possible relationship between *E* and *R* when there is modest worker interaction, while line *ef* represents a situation of more extensive interaction.

*27f. It seems unlikely that *D* is correlated with the level of employee productivity (*R*) since high-productivity people can be found in all types of work environments. Therefore, eliminating *D* should not bias the estimates of the remaining parameters α_0 and α_1.