Suppose that a person is enrolled in a defined benefit plan that promises a life annuity equal to 1% of final salary for each year of service, but caps the benefit at 40% of final pay. For simplicity, assume a 0% interest rate, a life expectancy of age 80, and earnings of $100,000 annually and no wage growth. The worker cannot begin collecting benefits until at least age 60. Assume a 0% interest rate and that the worker starts with the firm at age 31.

1. If the worker postpones retirement from age 65 to 66, the present value of pension benefits will (increase, decrease) by $______.

2. For the worker and pension described in (1), the "actuarially fair" increment to the annual pension benefit for postponing retirement from age 65 to 66 would be $______.

3. The actuarially fair increment for postponing retirement by one year (increases, decreases) as the person approaches age 80 and would be (larger, smaller) for a person with a longer life-expectancy.
   a. increases; larger.  b. increases; smaller.  c. decreases; larger.  d. decreases; smaller.

4. Suppose that under the program described in #1, a worker planned to retire at age 65. Now the program is changed and for every year beyond age 60, the worker would receive 1.5% of final salary instead of 1.0%. The income (or wealth) effect of this change would cause this worker to retire (earlier, later). The substitution effect of this change would lead the worker to retire (earlier, later).
   a. earlier; earlier.  b. earlier; later.  c. later; earlier.  d. later; later.

According to our discussions in class, the Social Security system was revised in the 1990s. The revisions included:

5. A(n) (increase, decrease, no change) in the normal retirement age.

6. A(n)(increase, decrease, no change) in the delayed retirement credit.

7. A(n)(increase, decrease, no change) in the penalty for retiring one year prior to the normal retirement age.
To answer the next 6 questions, consider the diagram below which provides a firm’s zero-isoprofit curve (xx) and a worker’s indifference curve (yy) between the hourly wage rate and the inside temperature at the work place.

8. Suppose that it is costless to keep the inside temperature equal to the outside temperature. Based on the information provided, it is reasonable to conclude that the outside temperature for this firm must be _______ degrees.

9. Based on the information provided, for any given wage rate, the worker would be happiest if the inside temperature was at _____ degrees.

10. Market forces should push the equilibrium temperature at this firm to:
   a. less than 68  
   b. 68  
   c. between 68 and 74  
   d. 74

11. As the outside temperature cools, we should expect that the firm’s zero-isoprofit curve would shift:
   a. upward  
   b. to the right  
   c. downward  
   d. to the left.

12. If workers’ tastes change and they like it to be warmer than they used to, we should expect the indifference curve (for the same level of utility reflected by yy) would shift:
   a. upward  
   b. to the right  
   c. downward  
   d. to the left.

13. If all workers have identical preferences regarding inside working temperature, but firms differ in the cost of controlling the temperature, we should expect the following relationship between wages and working temperature:
   a. wages would fall until the temperature reaches 68 degrees and rise for temperatures beyond 68 degrees.
   b. wages would rise until the temperature reaches 68 degrees and fall for temperatures beyond 68 degrees.
   c. wages would rise until the temperature reaches 74 degrees and fall for temperatures beyond 74 degrees.
   d. wages would fall until the temperature reaches 74 degrees and rise for temperatures beyond 74 degrees.

To answer the next 3 questions, suppose that workers at a factory currently work at a temperature of 85 degrees. Other things being the same, the workers would prefer a temperature below 85 but above 55. A worker safety group
convinces the federal government to mandate that the temperature be reduced to 78 degrees. Assume that the labor market is competitive and workers are free to move to competing jobs.

14. The mandate to limit the temperature to 78 degrees
   a. should make the workers better off.
   b. should make the workers worse off.
   c. could make the workers better or worse off.

15. The mandate to limit the temperature to 78 degrees
   a. should make the employer better off.
   b. should make the employer worse off.
   c. could make the employer better or worse off.

16. The mandate to limit the temperature to 78 degrees
   a. should cause the workers’ wages to rise.
   b. should cause the workers’ wages to fall.
   c. could cause the workers’ wages to rise or fall.

Consider the following estimated wage equations for men:

\[ W = 2.0 + 0.4 \text{Education} + 0.3 \text{Experience} \]

The average levels of education and experience are as follows:

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<th></th>
<th>Education</th>
<th>Experience</th>
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<tbody>
<tr>
<td>Men</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Women</td>
<td>14</td>
<td>6</td>
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Suppose the average wage for men is $9.20 and the average wage for women is $6.00.

17. Based on the information provided, how much of the $3.20 wage gap is "discriminatory“? __________.

18. Suppose that another important determinant of wages is whether the worker is in a job with high unemployment risk. Workers in jobs with higher unemployment risk receive a compensating difference for this risk. If women are more likely to be in jobs with high unemployment risk, the omission of this variable from the regression will cause the discriminatory share of the gap to be (over, under) estimated.

19. According to our discussion in class, other things being the same, married men earn (more, less) than single men and married women earn (more, less) than single women.
   a. more; more.  b. more; less.  c. less; more.  d. less; less.

20. If moving costs are higher for married men than single men, the monopsony model of discrimination would generate (higher, lower) wages for married men than single men because if they because if they are paid the same wage rate, the marginal expense of additional labor will be (higher, lower) for the married men.
   a. higher; higher.  b. higher; lower.  c. lower; higher.  d. lower; lower.
1. (6 pts) During the 1980s, the rate of return to a college education increased substantially in the U.S. List three factors that have been identified as important reasons for this.

1. The decline in unionism which had a disproportionately negative effect on the wages of less educated workers.
2. The decline in the real value of the minimum wage which had a disproportionately negative effect on the wages of less educated workers.
3. Increases in international trade that reduced the demand for low skill labor in the U.S. as the amount of "low skill imports" increased.
4. Technological changes that increased the demand for high skill workers and reduced the demand for low skill workers (e.g. increased computer technology eliminated some low skill jobs and increased demand for high skill workers to operate the technology).

2. (6 pts) Suppose that John attended college and upon graduation earned a salary of $40,000. Jack did not attend college and earned a starting salary of $25,000.

a. Give one reason why the $15,000 per year earnings differential would be an overstatement of the effect that college would have on Jack’s earnings;

The fact that John went to college and Jack did not might indicate that John is more intelligent than Jack. Consequently, if Jack goes to college, he might not do as well as John and may earn less than $40,000 after graduation.

b. Give two reasons why the $15,000 per year earnings differential would be an understatement of the effect that college would have on Jack’s earnings.

The $15,000 differential may be an understatement because
1. it excludes the value of fringe benefits, and typically, the fringe benefit package is more generous for higher paid workers.
2. the earnings growth of college graduates tends to exceed that of high school graduates. Consequently, while the difference between salaries could grow over time.
3a. (2 pts) What is an efficiency wage?

An efficiency wage is a wage payment that exceeds the wage that a worker could earn on her next best alternative.

b. (3 pts) Describe two ways that an efficiency wage could increase a firm's profits.

1. Since workers who receive an efficiency wage would take a pay cut if they lose their jobs, they will work harder to keep their jobs (e.g. not shirk, not call in sick, etc.) If the savings from greater effort exceed the cost of the higher wage, profits will increase.

2. Workers who receive an efficiency wage would be less likely to quit their jobs. This will reduce turnover costs (e.g. hiring and training costs) and if the reduction in turnover costs exceeds the cost of the higher wage, profits will be higher.

3. Offering an efficiency wage will attract a larger pool of job applicants and make it easier to attract and retain high quality workers.

c. (3 pts) If a firm pays an efficiency wage, would it prefer to hire a young or old worker? Why?

If a worker is fired, he loses the efficiency wage premium for the remainder of his career. Consequently, since the threat of a job loss is greater for a younger worker, the efficiency wage would have a greater motivational effect for a younger worker.

4a. (4 pts) What is a “deferred pay contract”? Be precise in your definition.

A deferred pay contract pays a worker less than his MRP early in his career, and above his MRP later in his career. Over the entire career, the deferred pay contract must pay at least the same amount in present value as the worker's alternative jobs in order to attract workers.

b. (4 pts) List two ways that a “deferred pay contract” could improve worker productivity over his or her career.

A deferred pay contract improves worker productivity by:

1. reducing turnover costs (e.g. hiring and training costs). After starting with the firm, a worker who leaves a deferred pay contract to his next best alternative will earn less than if he stays with the firm until retirement.

2. increasing work incentives. Since a worker will be penalized if forced to switch employers, the worker will put in greater effort to reduce the chances of being fired.
5. Suppose that you own a barbershop and have 5 barbers that work for you. Currently, you pay your barbers $15 per hour and they average 3 haircuts per hour. You are considering changing their method of pay to $6 per hour and $3 per haircut.

a. (4 pts) List two advantages from this change in the method of compensation.

1. *This pay system will attract and retain the most productive barbers, and discourage the least productive barbers from staying or applying.*
2. *For a given barber, this new system encourages greater work effort because barbers will increase their pay by working harder.*
3. *This shifts some of the risk of the demand for haircuts from the owner to the barber.*

b. (4 pts) List two disadvantages from this change in the method of compensation.

1. *The barbers may abuse equipment to speed up haircuts and increase pay.*
2. *The barbers may reduce the quality of haircuts to speed up haircuts and increase pay.*
3. *The barbers may be less willing to cooperate (perhaps fight over customers).*

6. (8 pts) Corporate CEO's are frequently paid on the basis of their corporation's stock performance. Some argue that this is unreasonable and that they should be paid on the basis of "relative performance".

a. Describe how to pay a CEO in the airline industry on the basis of a "relative performance contract".

*Pay according to how the company's stock performs relative to an index of other airline stocks.*

b. What advantage does the relative performance contract have compared to paying strictly on the basis of stock performance?

*This pay system does not reward (or penalize) the CEO for changes in the company's stock that are the result of shocks that are external to the CEO performance. For example, if all airline stock prices are reduced equally because of a terrorist attack, the CEO would not be penalized. If, however, the CEO is able to manage the company well (poorly) in response to the shock and its stock price falls less (more) than the others, there would be a reward (penalty).*

c. What disadvantage does the relative performance contract have compared to paying strictly on the basis of stock performance?

*CEOs would have an incentive to engage in behavior that might reduce its own profitability so long as it had a larger negative effect on competing firms. For example, the CEO may push for legislation that reduces all airline company profits so long as it reduces the profits of other airlines more.*
7. (5 points) Suppose that employer discrimination results in women being paid 20% less than men even though they are equally productive. How would competition eventually eliminate this discrimination?

Non-prejudiced employers would hire only women and would pay 20 percent less for labor than prejudiced employers. The higher costs of prejudiced employers would make it impossible for them to compete with non-prejudiced employers. Eventually, the prejudiced employers would be driven out of business by competition.

8. (5 points) Define "statistical discrimination". Give an example of statistical discrimination that would improve a firm's profits.

Statistical discrimination occurs when an employer estimates unobservable characteristics for an individual on the basis of the average characteristics of the group that the person belongs to. If, on average, single men are more likely to quit than married men, a firm concerned with turnover costs may statistically discriminate against single men. This discrimination would lead to lower turnover and improve the firm's profits.

9. (5 points). A study reports that, on average, black players in the NBA earn as much as white players\(^1\), but concludes that black players are discriminated against in terms of their pay. How is it possible for black players to be discriminated against yet earn the same?

Discrimination occurs when equally productive workers are paid differentially. If, on average, black players are more productive and paid the same as white players, black players would be discriminated against.

10. (6 points) Describe the piece of federal legislation with respect to fringe benefit provision that could cause firms to "outsource" certain kinds of services (e.g. rather than hire a custodian, pay a firm to provide custodial services.). Explain why the legislation leads to outsourcing.

Non-discrimination laws in fringe benefit provision require that highly and non-highly compensated workers receive essentially the same fringe benefit package. In the diagram below, the optimal mix of fringe benefits and wages is illustrated for a highly compensated worker. IS0 is an isocost curve; I0 is a worker indifference curve. The combination of \( w^* \) and \( f^* \) minimizes the firm's total cost for the worker. Since the tax advantages of fringe benefits are greater for highly compensated workers, the optimal package of fringes for the non-highly compensated workers (call it \( f_{L}^* \)) is likely less than \( f_h^* \). If the firm employs both types of workers, they will minimize costs by setting fringes somewhere between \( f_h^* \) and \( f_{L}^* \). However, this will drive up the costs of both worker types. For example, if the firm offers \( f_b^* \), its total costs are increased by the vertical distance between the isocost line and the point X. To avoid these higher costs, the firm can outsource its non-highly (or highly) compensated employees and offer the optimal fringe benefit package for the group that remains.
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