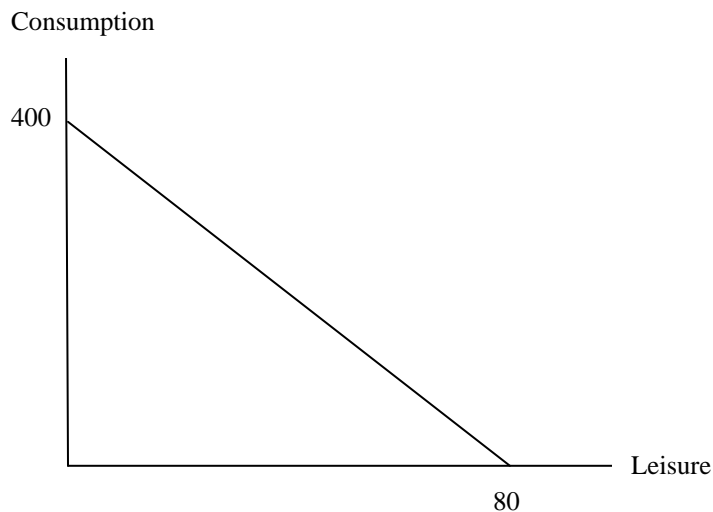


Finance 3022
Solutions to Problem Set #4

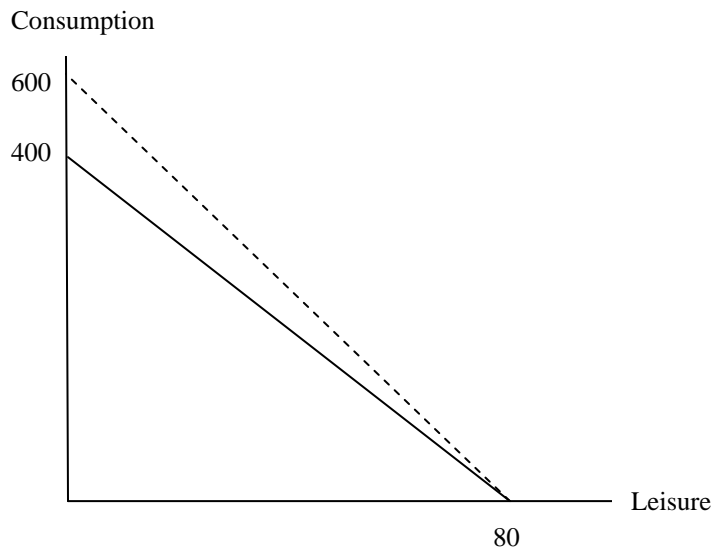
1)

# of Labor Hours	# of Widgets	MPL	VMPL = P*MPL (P=\$2)	VMPL = P*MPL (P=\$5)
1	25	25	50	125
2	45	20	50	100
3	60	15	30	75
4	70	10	20	50
5	75	5	10	25
6	78	3	6	15
7	80	2	4	10

- a) At a wage of \$10/hr, 5 hours of labor should be hired (The number where $VMPL = w$).
- b) At a wage of \$20, 4 hours of labor are hired.
- c) At a wage rate of \$25, 5 hours of labor are hired. Note this is the same decision as in (a). Why is the decision the same? Because the **real** wage is the same in both cases.
- d) At a wage rate of \$20 (but with double the productivity), 5 hours of labor are hired. That is, labor demand shifts to the right.
- 2) a) Again, the easiest way to do this is to think about the extremes. Suppose that you don't work at all (ie, consume 80 hours of leisure). In this case your income and, hence, consumption is zero. Therefore, (80, 0) is a possible (leisure, consumption) choice. The other extreme would be to work 80 hours (i.e., consume 0 hours of leisure). In this case you earn \$800 which you can use to buy 400 consumption goods. Therefore, (0,400) is another combination. Connecting these two points, once again, reveals all the possible combinations.



b) Suppose that the wage rate rises to \$15 per hour. How is your budget set affected? If you don't work at all, you are unaffected. If you work 80 hours a week, you can now earn \$1200 with which you can buy 600 consumption goods. Your budget line rotates clockwise. How is your labor decision affected? Again, there are two factors to consider. First, the rewards to working are higher which would suggest that you work more (substitution effect). On the other hand, at a higher wage, you're earning more money than you did before. In fact, you could work fewer hours and still bring home the same paycheck. This might suggest that you work less.



c) Your answer here depends on the relative strengths of the two effect discussed above. If the first (substitution) is stronger, the a higher wage implies higher employment and labor supply is upward sloping. If the second effect (income effect) is bigger, the a higher wage implies lower employment and, hence a downward sloping labor supply (the infamous “backward bending” labor supply).

- 3) The fact that labor supply has a very low elasticity (labor supply is vertical) suggests that the two effects (income and substitution) are of approximately the same magnitude and, hence, cancel each other out.
- 4) a) The total labor force is 500 people. On any given day, there are 25 people unemployed (20 have been out of work for a while, 5 for a short time). Therefore, the unemployment rate is $25/500 = .05 = 5\%$.

b) Over the course of a year, there are 60 people unemployed for a month (5 per month times 12 months) and 40 people unemployed for 6 months (20 over the first six months and 20 over the second). Making a total of 100. Of these hundred people, 40% (40/100) had a duration of 6 months and 60% had a duration of 1 month.

c) We could just take the average of the two durations and say that the average duration is $(1\text{mo.} + 6\text{mos.})/2 = 3.5$ months. This however, seems a little bit biased

upward because it doesn't account for the fact that it's less likely to be unemployed for six months. A better choice would be to calculate the *expected value* of duration, which is a weighted average of the two durations where the weights are the chances of each happening. $(.6)(1\text{ mo.}) + (.4)(6\text{ mos.}) = 3\text{ months}$.

- 5) With less capital to work with, the marginal product of labor in Germany fell. This would shift labor demand to the left. The real wage falls and employment falls.

