

Review Questions: Labor Supply

Econ520. Prof. Lutz Hendricks

Last updated: September 14, 2026

1. Labor Supply

1.1. Do the rich work more than the poor?

(10 points) In the data, rich people work about as many hours per year as poor people. Do you find this surprising? Explain.

Hint: The answer depends on whether the “rich” get their income from labor earnings or non-labor sources, such as dividends or interest.

Answer: This question is about competing **income and substitution effects**. Income effects: Leisure is a normal good. Rich people demand more of it, **if** they face the same relative prices (including real wages) as do poor people.
Substitution effects: People who earn high wages should work long hours (given income).
If the rich get their incomes from non-labor sources, we only have income effects and the fact is surprising. If the rich earn high wages, we have income and substitution effects that push in opposite directions. Then the fact is not surprising.

A little subtle: The answer also depends on whether the high earnings that the rich may enjoy are transitory (small income effects) or permanent (large income effects).

1.2. Labor supply over business cycle

(10 points) Over the business cycle, wages and hours worked move together (in expansions, wages and hours are high). But over the long term, wages and hours move against each other. Wages grow over time while hours worked decline. Why don't economists find this apparent contradiction surprising?

Answer: Mental model: income and substitution effects.

Transitory shocks: small income effects; substitution effects cause comovement between wages and hours worked. Intuitively, leisure becomes more expensive when wages rise.

Permanent shocks: large income effects, which push the other way. Intuitively, higher incomes lead households to demand more of all (normal) goods, including leisure.

1.3. Labor supply response to higher wages

(10 points) How does labor supply respond to higher wages? Explain your answer in terms of income and substitution effects. Distinguish between transitory and permanent wage increases.

Answer: Higher wages make work more attractive (leisure more expensive). That's the substitution effect. Hours increase.

Higher wages also increase permanent income. Workers demand more leisure. Hours fall. That's the income effect.

The net response depends on whether income or substitution effects are stronger. For transitory wage changes, income effects are small. For permanent ones, income effects are large and labor supply rises by less or even falls as wages rise.

1.4. Why is AS upward sloping?

(10 points) Explain the economic mechanism that generates an upward sloping aggregate supply curve (AS rises with P). And why does the supply curve shift when price expectations change?

Answer: Upward sloping supply curve: What matters is the discrepancy between actual and expected prices. It is really $Y^s = F(P/P^e)$.

The story in the AS/AD model: Labor supply is increasing in the real wage, but workers do not see the actual price level. Instead, they look at W/P^e . Inflation drives up W somehow (not W/P , but the nominal wage). In our model, firms set $P = (1 + m)W$, so $W = P/(1 + m)$. Workers see a high nominal wage and think it reflects a high real wage.

One could also tell a sticky wage story, though that's not in our model. Unanticipated inflation erodes real wage. Wages are set based on P^e such that W/P^e results in full employment (whatever that means). After wages have been set, shocks hit (e.g. Fed actions) that determine that actual P . Labor demand depends on the real wage W/P . If $P > P^e$, wages are set "too low." Real wages are below workers' target level. Firms hire more workers and employment is above full employment.

In both cases, it is apparent that only P/P^e matters, not P by itself. This is why P^e shifts the AS curve. Key implication: anticipated inflation is neutral.

Note: the question asks about the economic mechanism. A math answer along the lines of "in the labor supply equation $Y^s = F\left(\frac{P}{P^e} \times \frac{1}{1+m}, z\right)$, higher P^e reduces the argument of F " does not really answer the question.

1.5. Anticipated vs unanticipated price increases

(10 points) The labor supply equation $N^s = F\left(\frac{P}{P^e} \times \frac{1}{1+m}, z\right)$ says that unanticipated price increases raise employment while anticipated price increases do not. Explain the difference.

Answer: Labor supply depends on the perceived real wage W/P^e .

Unanticipated $P \uparrow$: P^e unchanged. $W \uparrow$ because firms pay workers their marginal value product ($W = P/(1 + m)$). The perceived real wage rises.

Anticipated $P \uparrow$: P/P^e unchanged. Hence W/P^e unchanged. No change in labor supply.

1.6. Why is the medium run supply curve vertical?

(10 points) Why is the medium run supply curve vertical ($Y_n = F(1/(1 + m), z)$)?

Answer: Target hours are determined by preferences (F), real wages ($1/(1 + m)$), and other work incentives (z). There is no good reason why the price level should play a role. The price level matters in the short run only because changing prices affect (perceived) real wages. In the medium run, this is not the case ($P = P^e$).

2. Labor Demand

2.1. Why is aggregate labor demand not a function of AD for goods?

(10 points) For a single firm, labor demand clearly depend on demand for its good. However, aggregate labor demand may not depend on aggregate demand for goods? Where does the difference come from? How does your answer depend on the stickiness of wages?

Answer: For a single firm: hire workers until the marginal product of labor equals the real wage $\frac{W}{P_i}$. More demand allows the firm to raise prices. Since wages do not adjust (the firm is small), it hires more labor.

When aggregate demand rises, all firms raise their prices. If labor supply depends on the real wage, workers will demand higher nominal wages. If wages are flexible, they rise until the real wage is the same again. But if wages are fixed, the aggregate outcome looks more like that for a single firm.

3. Labor Market Equilibrium

3.1. What is full employment?

(10 points) Economists routinely say that we are above full employment, even though the unemployment rate is positive. How is this possible? What does “full employment” mean?

Answer: Full employment means the level of employment attained when all the pricing frictions have resolved. Its level is determined by the real wage, incentives for non work (e.g., unemployment benefits), and worker preferences (that shift the labor supply curve).

At full employment, not everyone works. If unemployment were measured perfectly, only frictional unemployment would remain (people are between jobs). In reality, people file for unemployment even though they don't want to work and vice versa. So measured unemployment will be positive.

4. Current vs Future Productivity Shocks

Consider a Walrasian labor market: the real wage adjusts so that labor supply equals labor demand.

Questions:

1. (12 points) Show the effects of a current temporary increase in labor productivity on employment and wages. Illustrate your answer in a graph. Explain in terms of income and substitution effects.

Answer: Current, temporary shock: small income effects, but substitution effects. We move along a (roughly) fixed labor supply curve. Labor demand increases. Employment and wages rise.



2. (12 points) Show the effects of a future permanent increase in labor productivity. Why does your answer differ from the previous question?

Answer: Future shock: only income effects. Labor supply decreases. No change in labor demand (current productivity is unchanged). Employment declines and wages rise.

The difference: A current temporary shock makes work more attractive today, but barely changes lifetime income. A future shock raises lifetime income, but does not make work more attractive today.

5. Productivity Growth and the Labor Market

Productivity has been growing at about 2% per year for a long time. Illustrate your answers in a labor market diagram.

Questions:

1. (8 points) Illustrate the effects of productivity growth in a Walrasian labor market diagram.

Answer: The diagram shows upward sloping labor supply and downward sloping labor demand (the marginal product of labor). Productivity growth shifts labor demand up. Wages and hours rise.



2. (8 points) Why did we not observe rising hours worked as rising wages move workers along the labor supply curve (which we assume to be upward sloping)?

Answer: Income effects increase the demand for leisure. The labor supply curve shifts up. Whether hours rise or fall depends on whether labor supply or labor demand shifts faster.

3. (9 points) Why did we not observe rising unemployment or falling wages as a given amount of goods can be produced with fewer workers (think NC textile mills)?

Answer: If aggregate demand were fixed, this is what we would observe. And we do observe falling employment in some industries where productivity grows and demand does not keep up (this is one reason why manufacturing declines). However, additional income generates rising demand for goods. Aggregate demand shifts out. Labor demand increases. Flexible wages and prices ensure full employment. Wages are determined by the marginal products of the marginal workers.

6. College Wage Premium

The college wage premium (the average wage earned by college graduates relative to high school graduates) has been rising sharply since 1980. At the same time, the share of college educated workers has been rising.

Questions:

1. (15 points) How can these two observations be reconciled in a Walrasian labor market model? Illustrate your answer in a graph. What exogenous “shocks” could have caused this development? What prevented the skill premium from rising before the 1980s?

Answer: We need demand for college educated labor to shift out faster than supply. Skill-biased technical change and international trade are two candidate explanations.

The supply of college educated labor has been rising for a long time. By itself, this would push down the college premium. However, the demand for college educated labor has also been rising (“skill-biased technical change,” whatever that exactly is). Until the 1980s, the two

forces roughly balanced each other and the college premium was more or less constant. In the 1980s, college attainment stalled, but demand continued to rise.

2. (10 points) Given that the wages of college graduates have been rising, should we expect that college educated persons work longer hours as time goes by? Explain.

Answer: One could expect college workers to move up along a fixed labor supply curve. But income effects shift the supply curve left all the time (higher lifetime incomes when wages rise permanently). The net effect on hours is not clear.