The Labor Market

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Issues

- We move from the short run to the medium run
- Short run:
  - supply is elastic; we don't have to worry about it
  - only demand matters
- Medium run: supply depends on prices
  - price setting mechanisms push output towards trend
  - demand and supply matter
- Long run: output is on its trend growth path
  - only supply matters
  - capital stock is endogenous

Objectives

In this section you will learn:

1. how wage setting determines unemployment
2. how to set up the AS-AD model
3. how price adjustment pushes the economy towards the long-run trend growth path
4. how to analyze policies and shocks

Wage Determination: Walrasian Model

Wage Determination

- How wages are set determines
  - the level of unemployment
  - the adjustment path towards full employment
- We start with a standard Walrasian view
  - there is no unemployment
  - this approach is useful for the long run, but not for the medium run
- We then introduce the key labor market friction that generates unemployment

Labor Demand

Basic idea:

- Firms hire labor until real wage equals marginal product of labor.
- The last worker just pays for themselves.

The labor demand curve is the MPL curve.

- Labor demand is determined by technology.
- Wages are marginal products (not set in China).

Example

Cobb-Douglas production function:

$$Y = \bar{A} K^{\alpha} L^{1-\alpha} \tag{1}$$

Parameters:

- productivity $\bar{A}$
- "capital share" $\alpha \in (0,1)$

$$MPL = dY/dL = (1-\alpha)\bar{A} K^{\alpha} L^{-\alpha} \tag{2}$$

The firm hires labor until $w = MPL$.

Everything else $(\bar{A}, K)$ equal, the wage is downward sloping in L.

What shifts labor demand?

Labor Supply

We should derive labor supply from the household's decision how much to work / how much leisure to consume.

For now, we just assume that higher wages are associated with more labor supply.

Is this obviously true?

Other Stories

Reasons why higher real wages may increase employment:

1. Efficiency wages
   - 1.1 firms need to provide incentives for work effort
   - 1.2 they must pay a high wage, so that getting fired is costly for the worker
2. Centralized wage bargaining
   - 2.1 labor unions bargain with employers
   - 2.2 their objective is to get the highest wage for the largest number of workers
3. Search and Matching
   - 3.1 if the unemployment rate is high, jobs are hard to find, but vacancies are easy to fill
   - 3.2 this gives firms bargaining power, which drives down wages

Labor Market Equilibrium

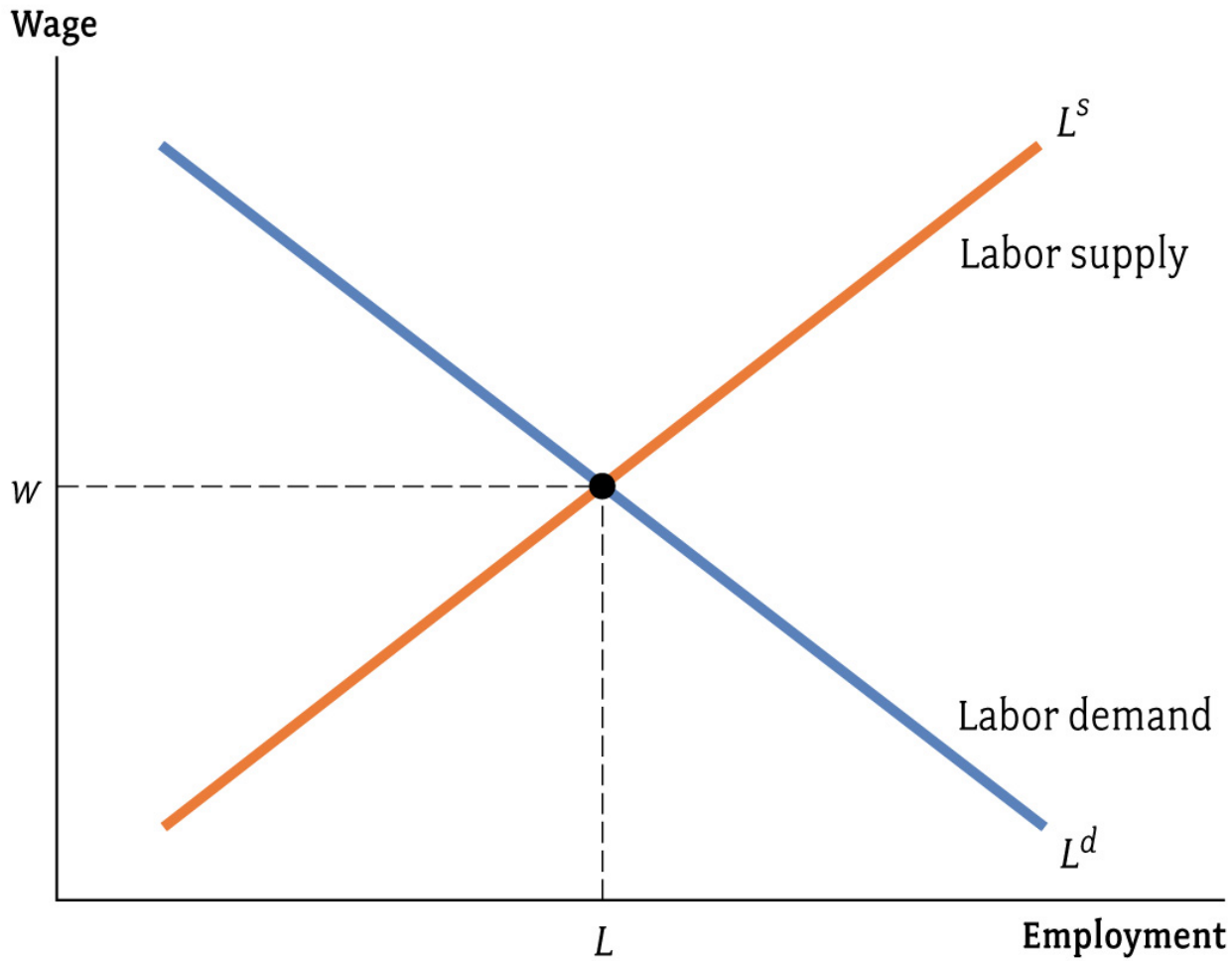


FIGURE 7.3 The Labor Market

Macroeconomics, Charles I. Jones

Change in labor demand

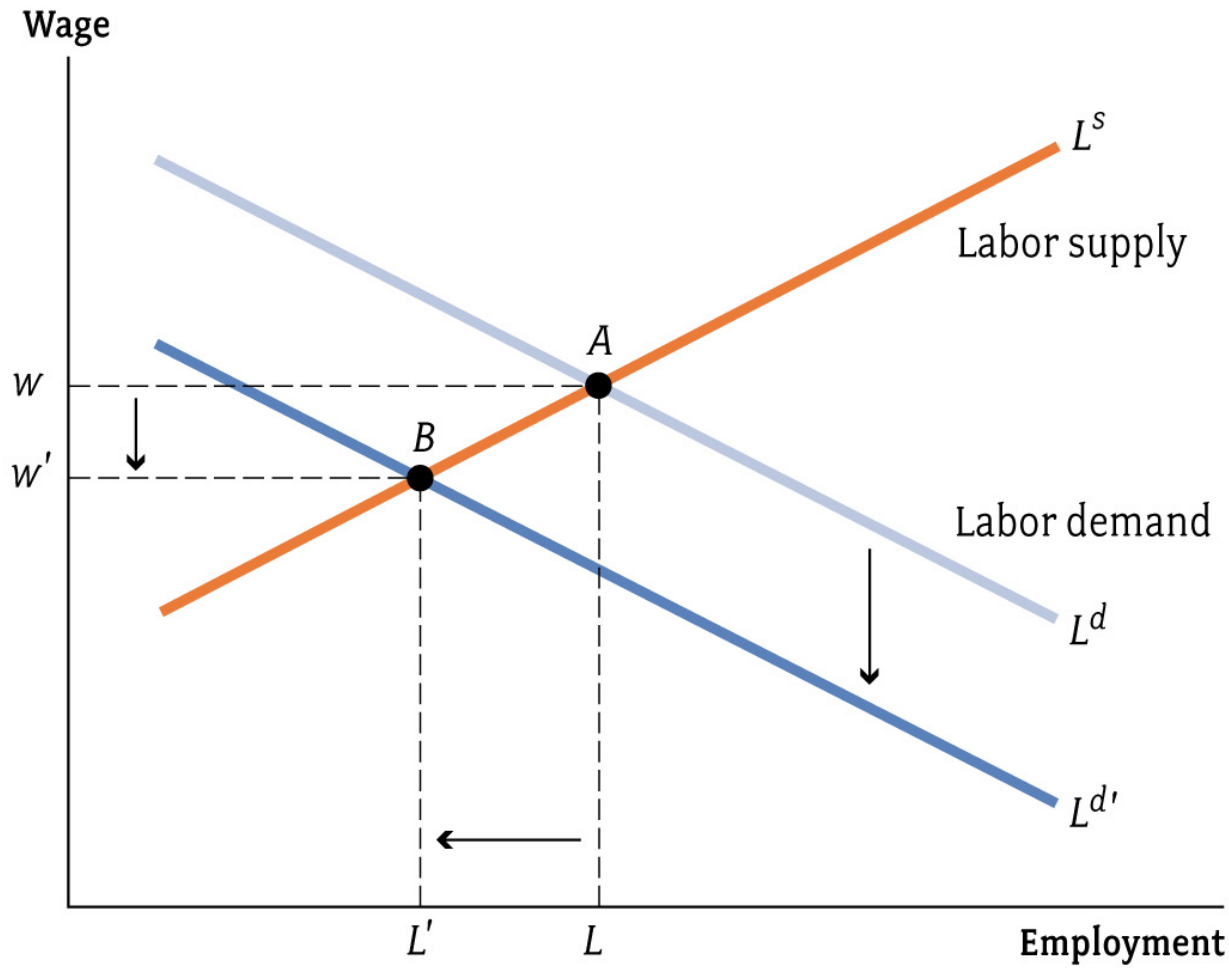


FIGURE 7.5 A Reduction in Labor Demand

Macroeconomics, Charles I. Jones

Where is unemployment?

Which workers are unemployed?

In what sense?

Where is unemployment?

Insight:

We are missing a friction that prevents workers from finding jobs.

Would measured unemployment be zero?

Where is unemployment?

Insight

Unemployment is an arbitrary concept.
Caution when interpreting unemployment rates.

A Model With Frictions

The Idea

The basic idea we want to capture:

Unexpected inflation increases output

- either by increasing labor supply or labor demand
- monetary policy has real effects in the short run
- but they wear off as expectations adjust

Anticipated inflation just increases prices.

- this is why money is neutral in the long run

The Labor Demand Story

The story in a nutshell

1. Inflation erodes the real wage.
2. At lower real wages, firms hire more labor.
3. Hence, employment is higher when inflation is higher

This requires **sticky wages**.

- Sticky prices would work as well (a different channel).

The Labor Demand Story

Wage bargaining sets **nominal wages** W for a period of time.

Workers aim for a certain **real wage** $W/P = w$.

- If "economic conditions" are good, the target W/P is high.

They have price expectation P^e and set $W = wP^e$.

Firms set employment based on the true W/P.

If price expectations are correct: $P^e = P \implies W/P = w$

- we get "full employment" (workers work as much as they want)
- that's the Walrasian outcomes

The Labor Demand Story

If workers get P^e wrong, the real wage deviates from w.

Notably: unexpected inflation implies $P > P^e$

The real wage is eroded

$$W/P = (W/P^e)(P^e/P) \tag{3}$$
$$= w(P^e/P) \tag{4}$$
$$< w \tag{5}$$

That induces firms to hire more (cheap) workers.

Unexpected inflation can stimulate the economy.

This is a good story – but not the one we are modeling.

The Labor Supply Story

The model (adapted from the text) contains a different version of the story (for simplicity).

Labor supply:

- $N^s\left(W/P^e\right)$ is increasing in the perceived real wage.

Labor demand:

- perfectly elastic at a fixed real wage $W/P = 1/\left(1+m\right)$.

Unexpected inflation increases W and thus W/P^e.

- Workers think the real wage is high.
- They supply more labor and employment rises.

Labor Supply

Labor supply:

$$N^s = \hat{F}\left(W/P^e, z\right) \tag{6}$$

z: labor market conditions

- unemployment benefits, taxes, etc

Key: N^s depends on the real wage evaluated at P^e (not P).

We assume that N^s is increasing in W/P^e.

Labor Demand

In general: marginal cost is an increasing function of wage W and employment N.

We simplify and assume:

- Output is produced from labor only: $Y = N$
- Marginal cost is constant at W.

Assumption: Firms set prices as a markup over marginal cost.

$$P = (1+m)W \tag{7}$$

Implications:

1. the real wage is **fixed**:

$$W/P = \frac{1}{1+m} \tag{8}$$

2. labor demand is **perfectly elastic** at this real wage

Labor Market Clearing

In general we would set $N^S = N^D$.

But here N^S is horizontal at the fixed real wage $1/(1+m)$.

So we sub that real wage into labor supply to get market clearing (graph this).

$$N = \hat{F}(W/P^e, z) \tag{9}$$

$$= \hat{F}\left(\frac{P}{P^e}\frac{W}{P}, z\right) \tag{10}$$

$$= \hat{F}(\underbrace{\frac{P}{P^e}}_{\text{mistake}}, \underbrace{\frac{1}{1+m}}_{\text{real wage}}, z) \tag{11}$$

Employment is increasing in P/P^e and z.

Model Summary

Production function

$$Y = N \tag{12}$$

Labor demand:

$$W/P = 1/(1+m) \tag{13}$$

Labor supply:

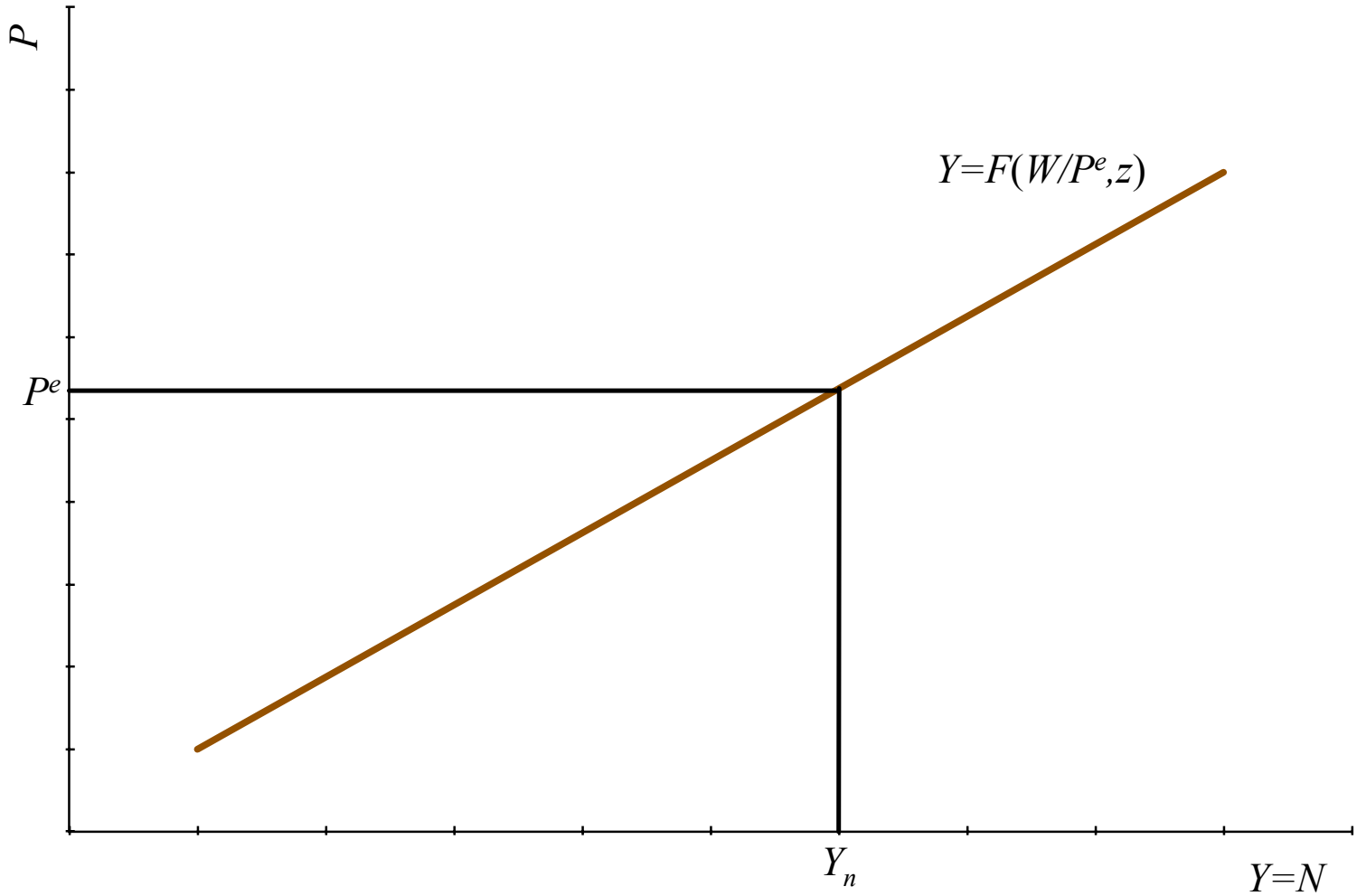
$$N^S = \hat{F}(W/P^e, z) \tag{14}$$

Labor market clearing:

$$Y = N = \hat{F}(W/P^e, z) \tag{15}$$

$$= \hat{F}\left(\frac{P}{P^e}\frac{1}{1+m}, z\right) \tag{16}$$

Summary



Higher (unexpected) prices $\Longrightarrow$ higher employment.

Intuition

Workers see a high nominal wage and think they see a high real wage.

So they supply more labor.

In reality, price setting by firms fixes the real wage

- Workers are wrong every time.

Until worker's price expectations adjust $(P^e \rightarrow P)$, inflation affects employment.

Exercises

What happens to $Y = N$ when

1. price expectations are higher?
2. markups rise?
3. unemployment benefits improve?

Natural Rate of Unemployment

When price expectations are correct:

$$Y_n = N_n = F\left(1/\left(1+m\right), z\right) \tag{17}$$

This is the medium-run outcome.

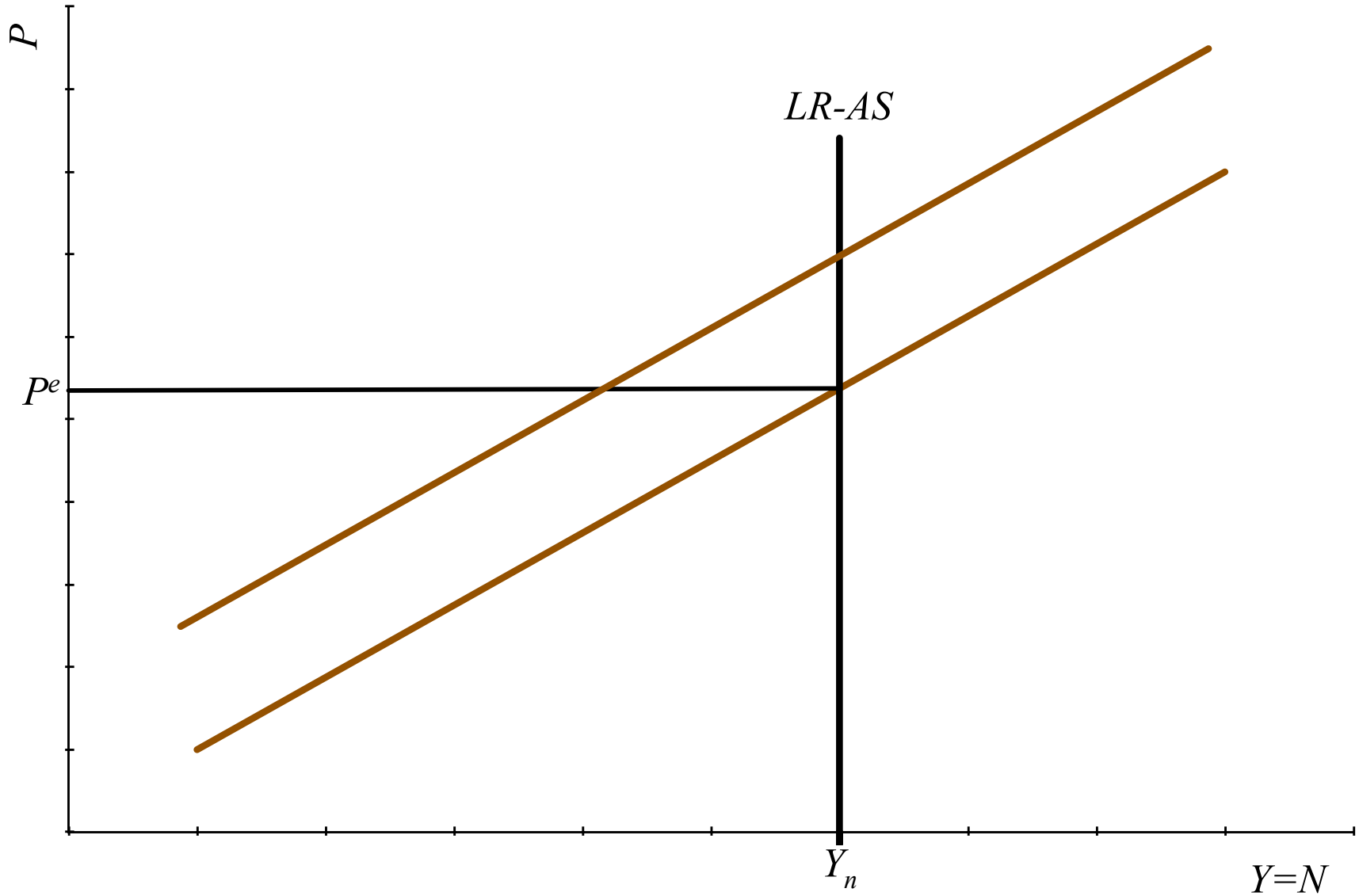
- The long-run supply curve is **vertical.**
- The price level does not matter.

Full employment should really be called "normal employment" or "trend employment."

- Not everyone works.
- But those who want to work do.

What affects full employment?

Long-run Supply Curve



What's Next?

- If price expectations were always correct, we would be done:
  - markups and labor productivity determine the real wage
  - the real wage determines (un)employment
  - employment determines output
- This is what happens in the long run
  - only the supply side matters
- But what happens when $P^e \neq P$?

Creating Jobs

A bipartisan infrastructure deal being negotiated in the U.S. Senate could create roughly half a million new manufacturing jobs by 2024, the end of President Biden's first term, an analysis conducted on behalf of the trade group Association of Equipment Manufacturers found.

The analysis by IHS Markit assumes the manufacturing jobs would come from $1.1 trillion spent over eight years starting in 2022, with 75% of funding to be spent in the first five years.

CBS New, July 27, 2021

Destroying Jobs

The same logic applies to measures that raise the cost of doing business:

> *Michele Bachmann, the congresswoman from Minnesota, in 2011 said she wanted to rename the Environmental Protection Agency "the job-killing organization of America" and Mitt Romney lamented that "Day by day, job-killing regulation by job-killing regulation, bureaucrat by bureaucrat, this president is crushing the dream."*
>
> *The Atlantic, Jan 19, 2017*

What is the link between regulation and long-run employment?

Reading

- Blanchard / Johnson, Macroeconomics, 6th ed, ch. 6

Further Reading:

- Jones, *Macroeconomics*, ch. 7.