Econ 1101
Spring 2013

Radek Paluszynski

5/1/2013

Announcements

- **Final exam**: Tuesday, May 14th, 6.30-8.30pm
  - If you have exam conflict, there is a makeup final on Thursday, May 16th, 10am-12pm
  - Registration deadline for the makeup
    - Tuesday, May 7th at 4pm
    - To register, email headgrader@gmail.com
- Review sessions (Anderson 330):
  - Friday, May 10th, 4.00-5.30 pm
  - Friday, May 10th, 6.00-7.30 pm
- Homework 10 due this Friday!

Agenda

- Demand for factors of production
  - derived demand for labor
- Consumer's choice of work and leisure
- Labor market equilibrium
- Real wages and productivity
- Differences in wages
- Increase in the skill premium and skill-biased technical change
- The economics of superstars
- Inequality: the 99% and the 1%
- The impact of Trade Unions
- The economics of labor market discrimination

Demand for Factors of Production (with a focus on labor)

- So far we have studied:
  - Consumer's demand (choice between two goods)
  - Firm's supply
- Now we want to look at the firm's demand for production inputs.
- Note: the firm does not require labor for its own sake, the firm wants it to make a profit.
- Hence, this demand can be obtained by putting together the following:
  - Technology of a firm
  - Output prices
  - Input prices

Production technology

- Technology is given by the Production Function.
  - Specifies how the final output depends upon inputs.
- For example, for a lawn business, we could have the following inputs:
  - 2 workers for a full day (8 hours)
  - 1 truck
  - 2 lawn mowers
  - 1 edger
- and as a result we might get 10 lawns mowed.
- If we add more inputs, we get more output (this should be intuitive).

- Now, suppose we add another worker and we can now mow 13 lawns.
- The Marginal Product of Labor (MPL) in going from 2 to 3 workers is:

  13-10 = 3 lawns
- How much labor should the firm hire?
  - That will depend upon the price of lawns.
    - Suppose the price is $40 per lawn.
    - Value of the marginal product equals:

      PxMPL = $40x3 = $120
  - Should you hire the third worker?
    - That will depend upon the market wage.

- Suppose wage > $120 a day
  - This means that wage > Value of MPL
  - It's a good / bad idea to hire another person.
- Suppose wage < $120 a day
  - This means that wage < Value of MPL
  - It's a good / bad idea to hire another person.

- Suppose wage > $120 a day
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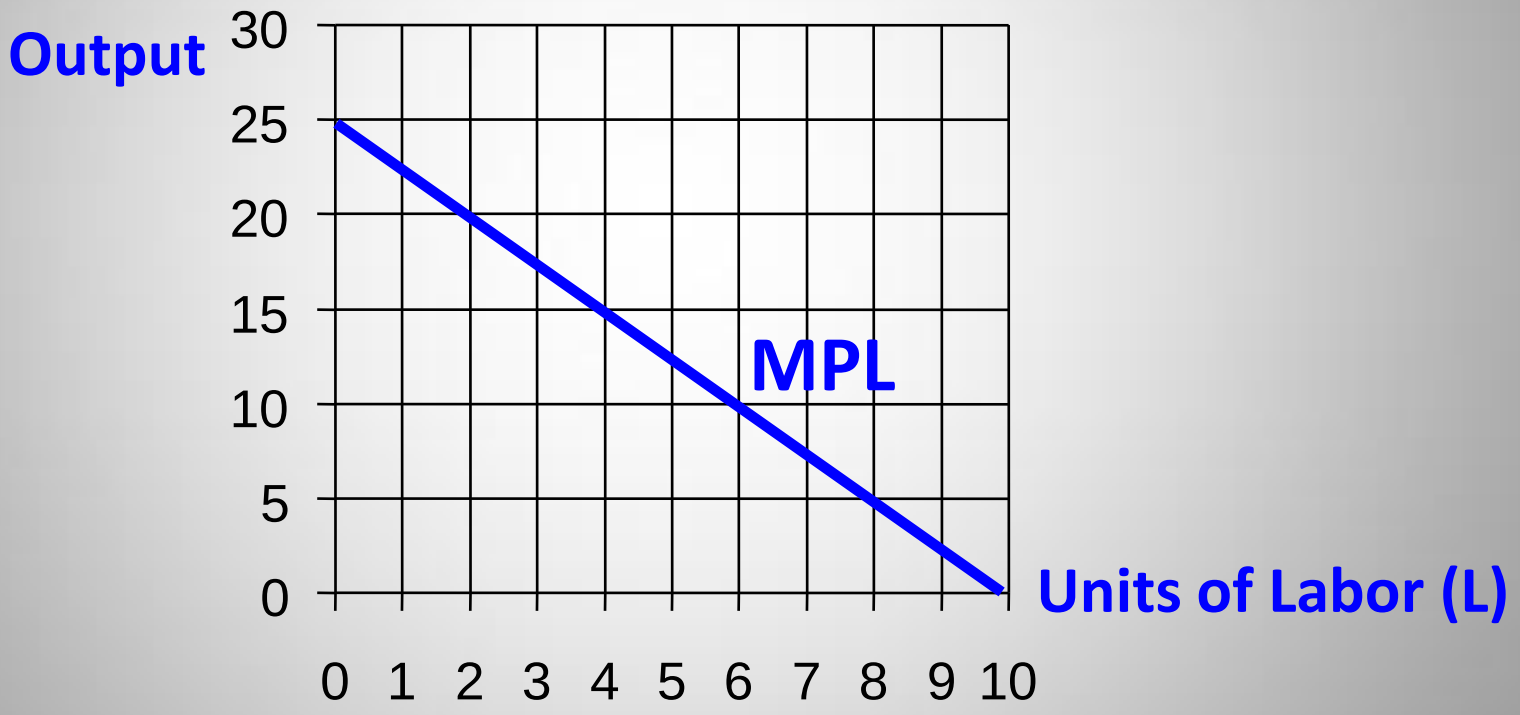
  - It's a ~~good~~ / bad idea to hire another person.
- Suppose wage < $120 a day
  - This means that wage < Value of MPL
  - It's a good / ~~bad~~ idea to hire another person.
- General Rule: The number of workers hired will be such that <u>wage = Value of MPL</u>

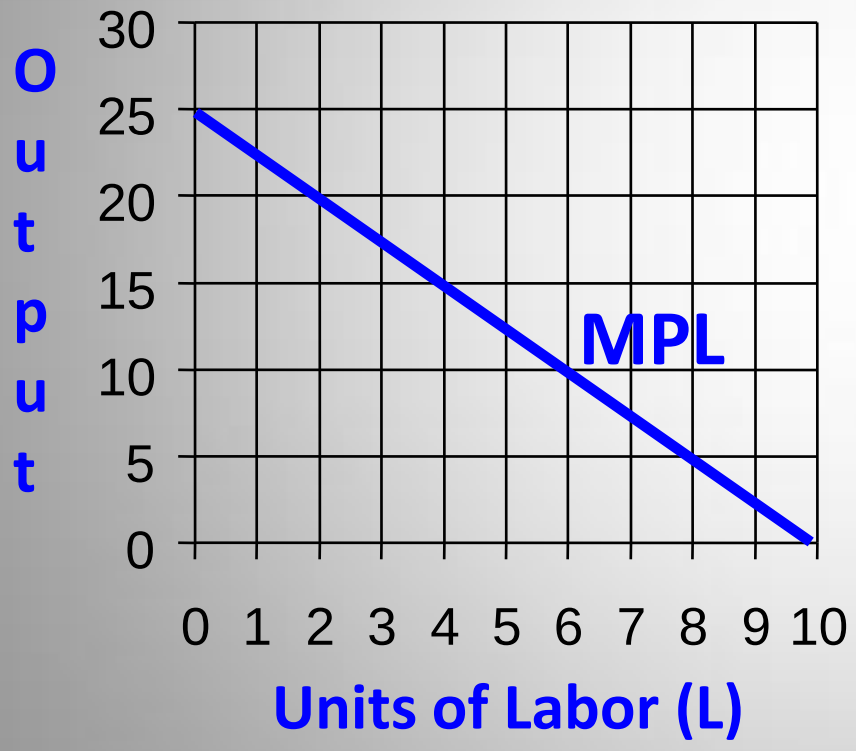
Back to our original example

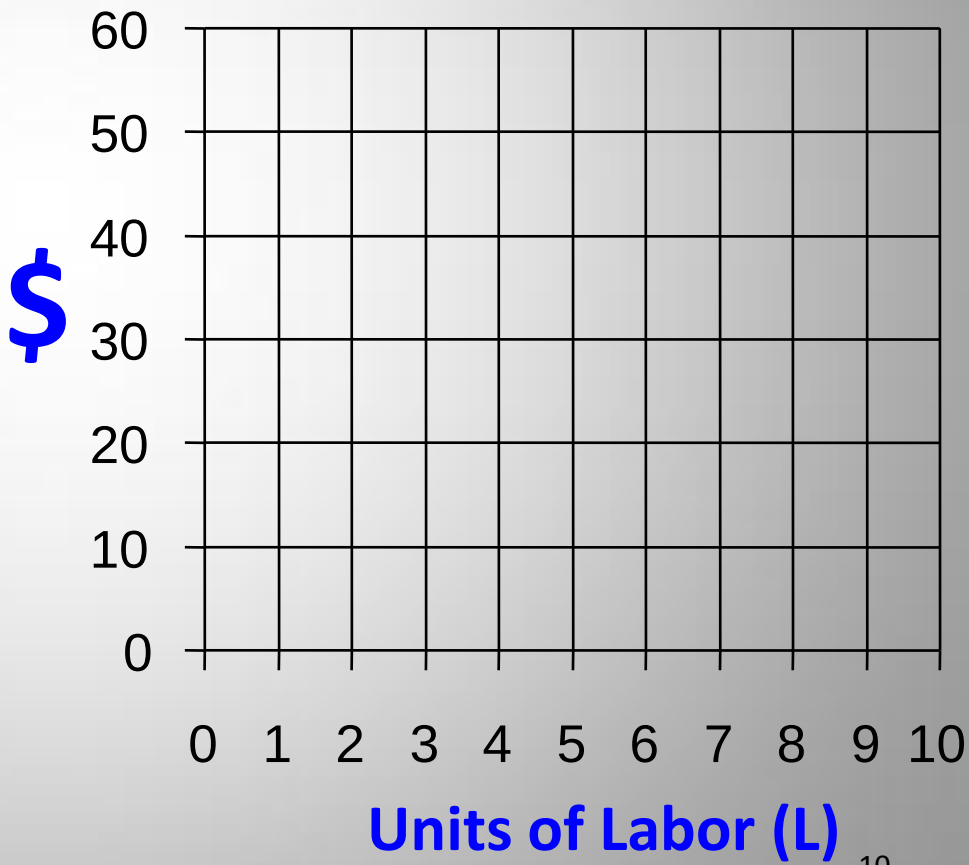
- Suppose the marginal product of labor looks like this:



- Note: We have a diminishing marginal product – MPL is downward-sloping

- Suppose the output price is $2.
- What is the producer's derived demand for labor? (i.e. what is the Value of the MPL)?





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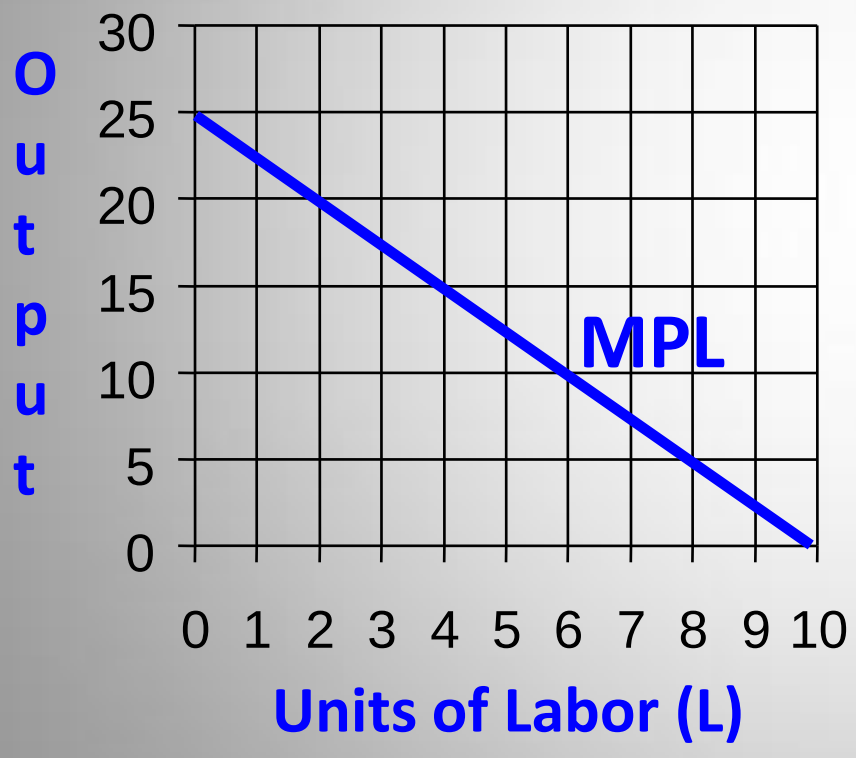
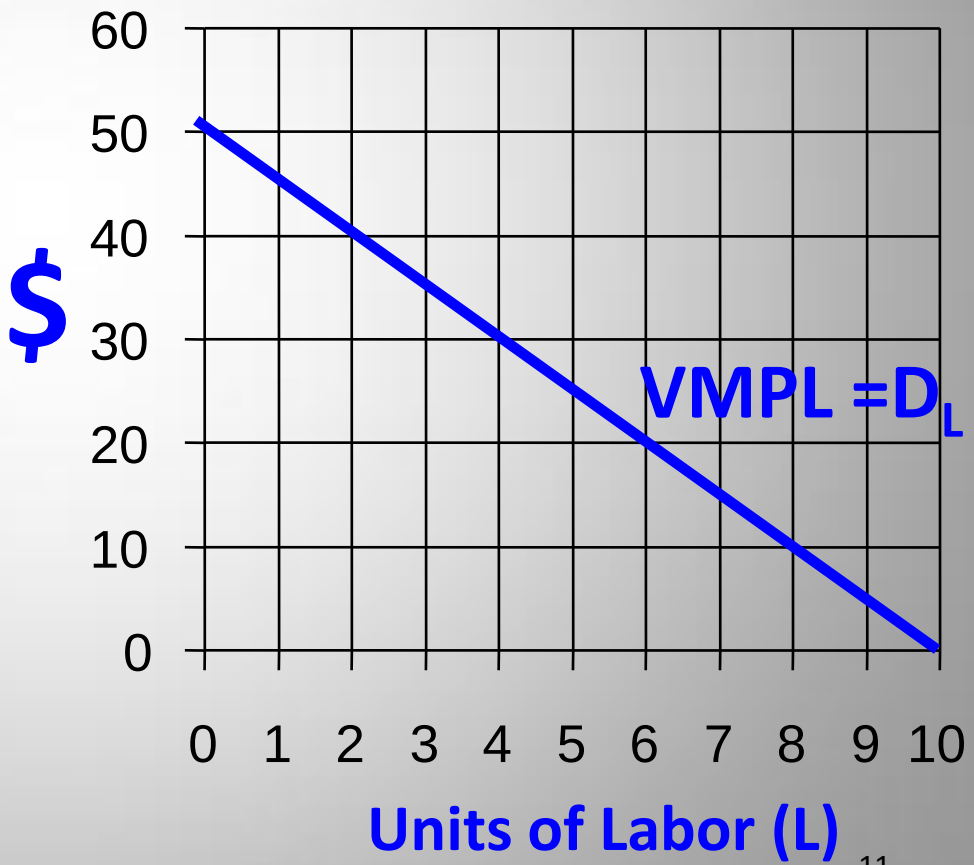
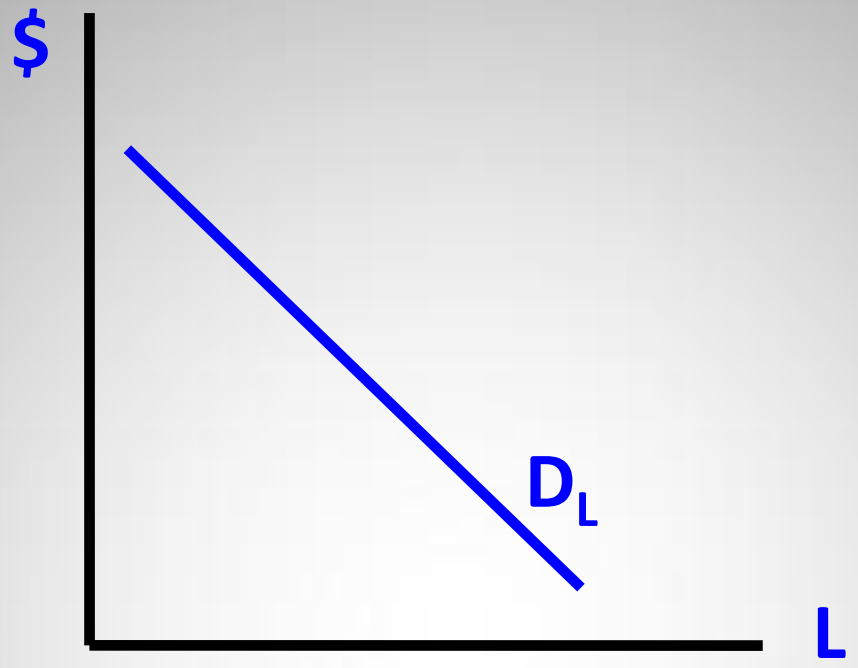
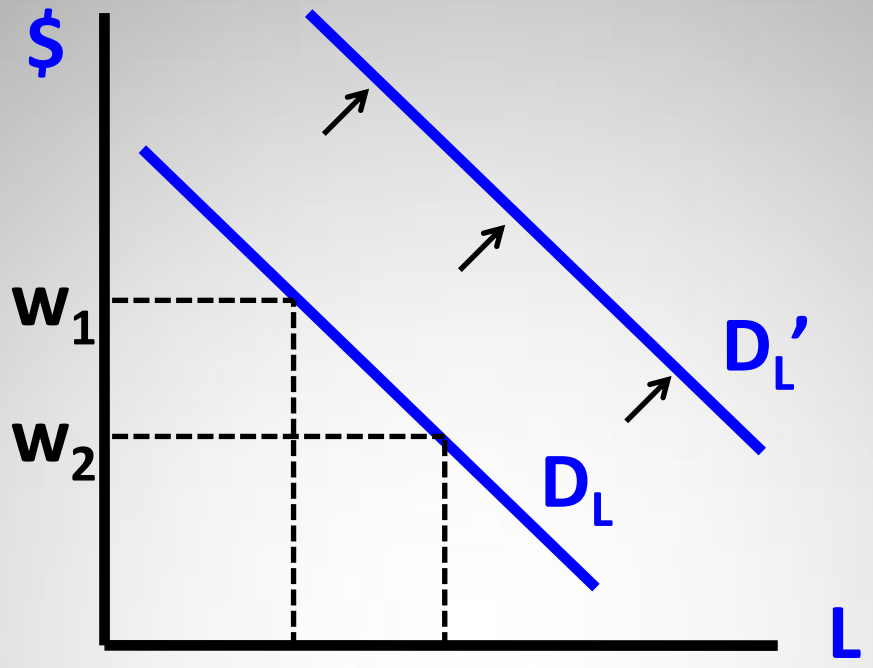




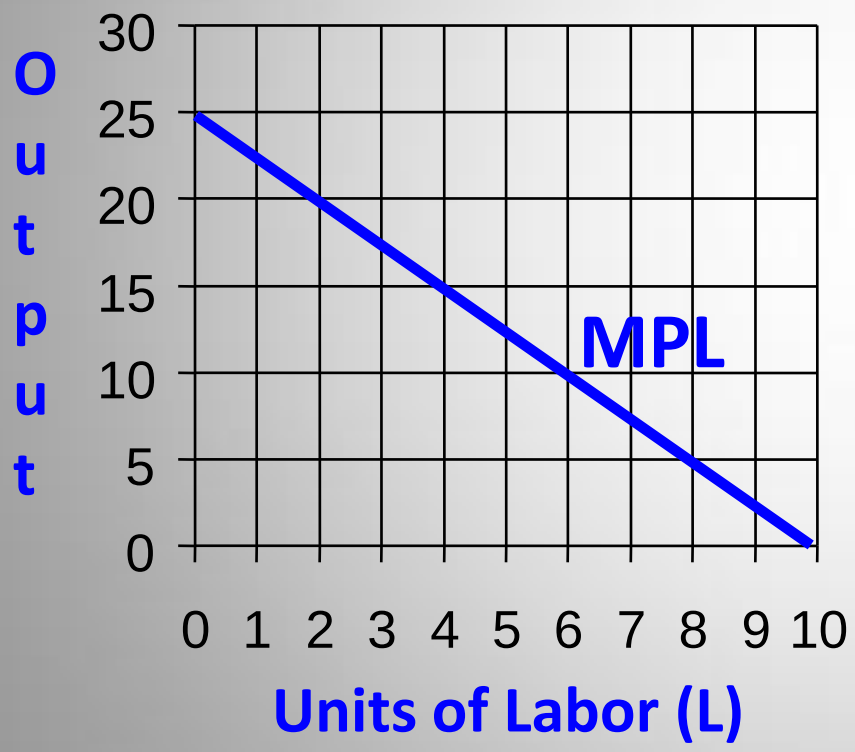


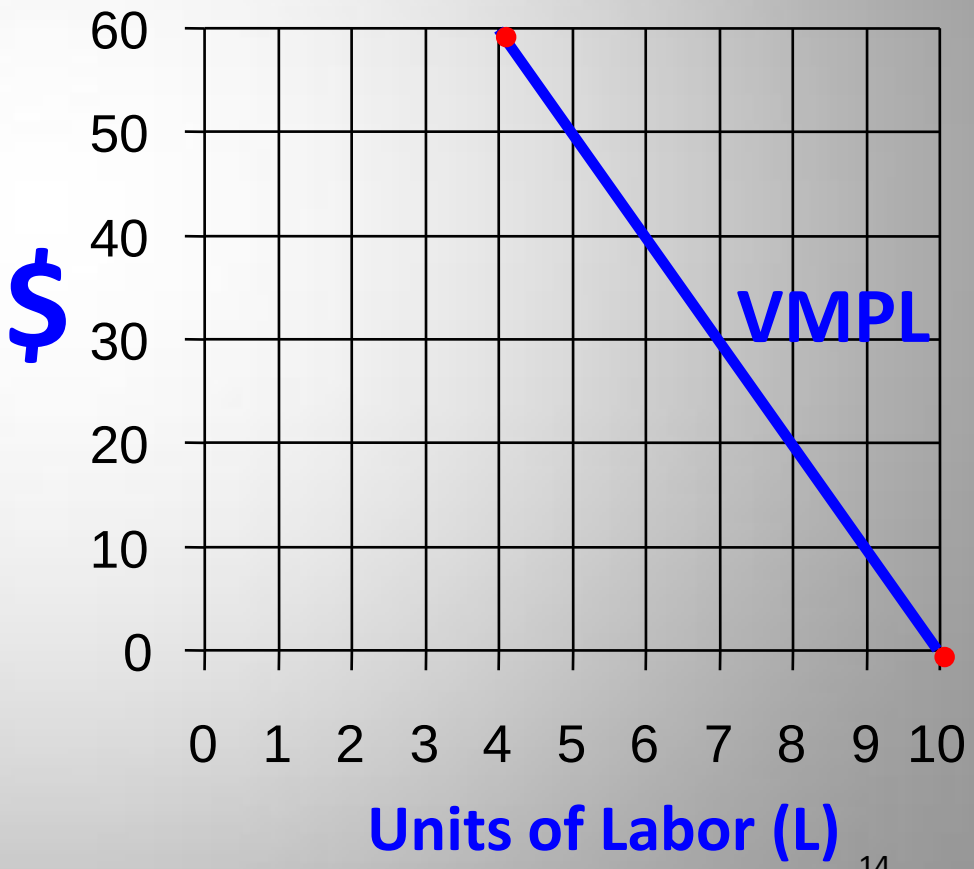
- What happens when the wage changes?
  - _____
- What happens when output price changes?
  - _____



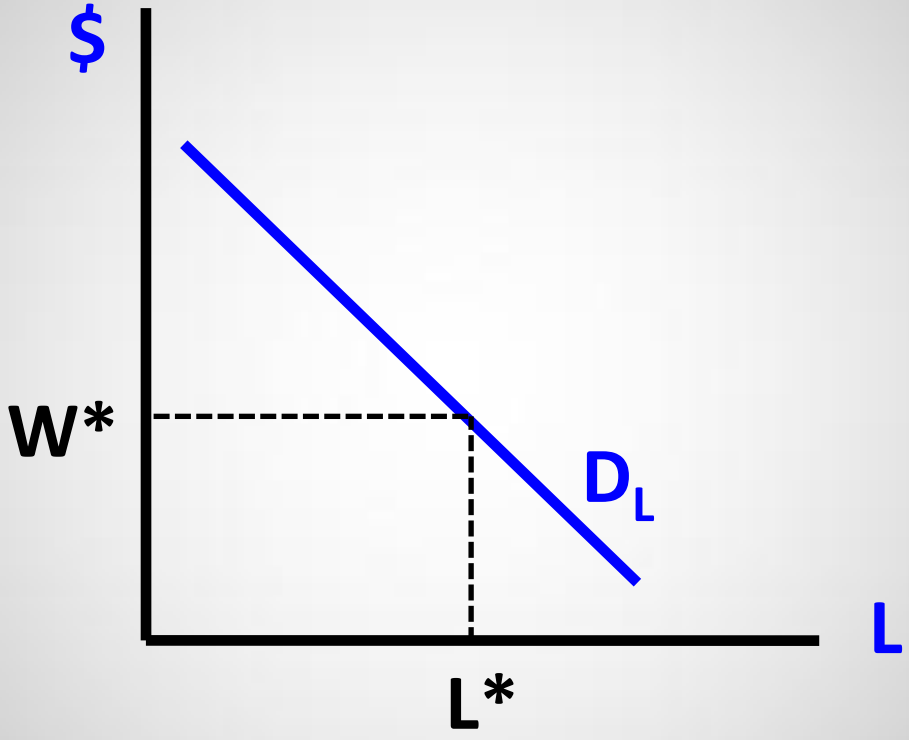
- What happens when the wage changes?
  - Movement along the curve
- What happens when output price changes?
  - Demand curve shifts

What if price increases from $2 to $4? (in our previous example)



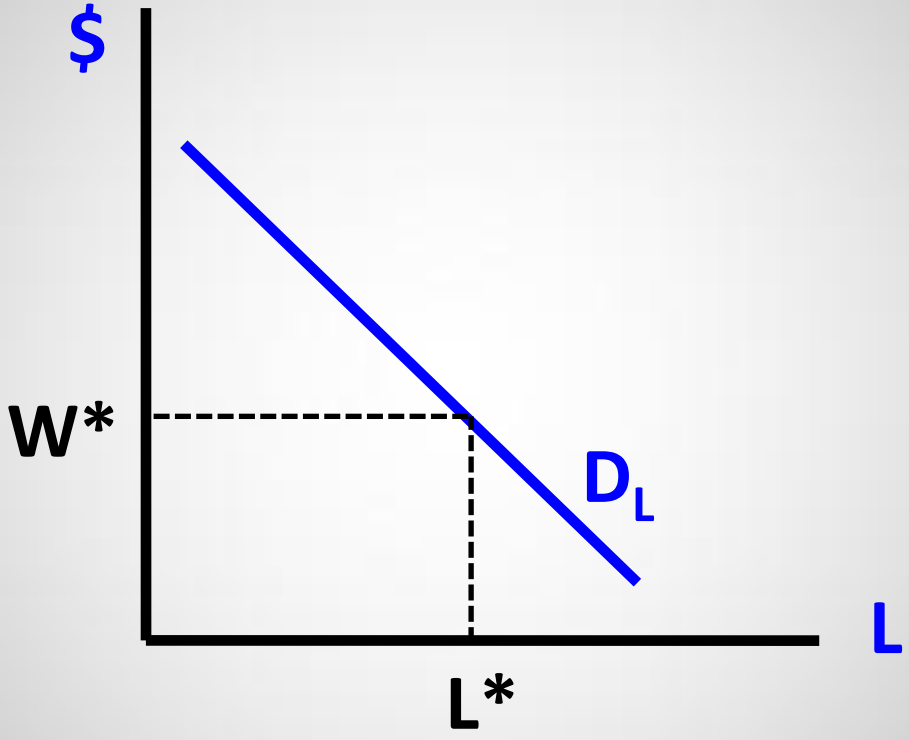


- Now, we can just add the labor supply to obtain the equilibrium in this labor market.



- OK, but where do we take that supply from?

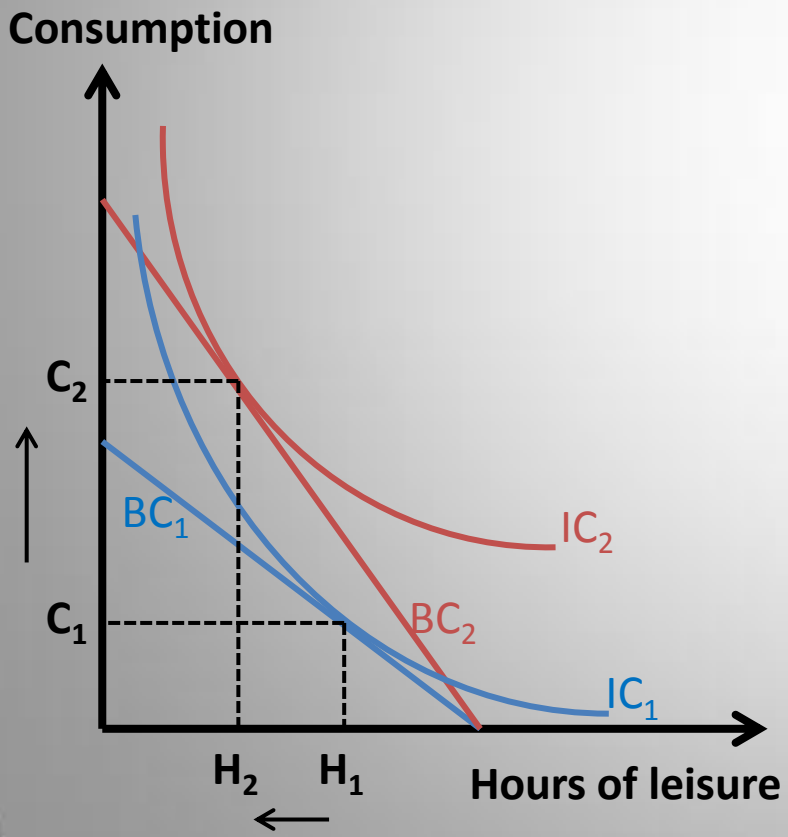
- Now, we can just add the labor supply to obtain the equilibrium in this labor market.

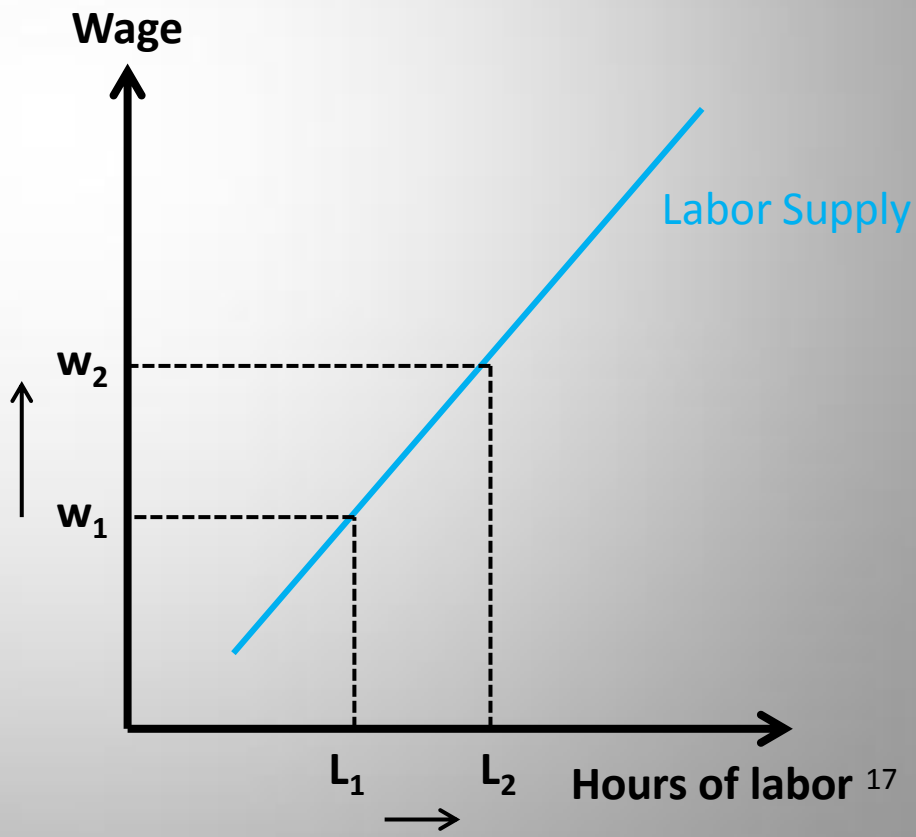


- OK, but where do we take that supply from?
  - Consumer's choice of work and leisure

Consumer theory revisited (1)

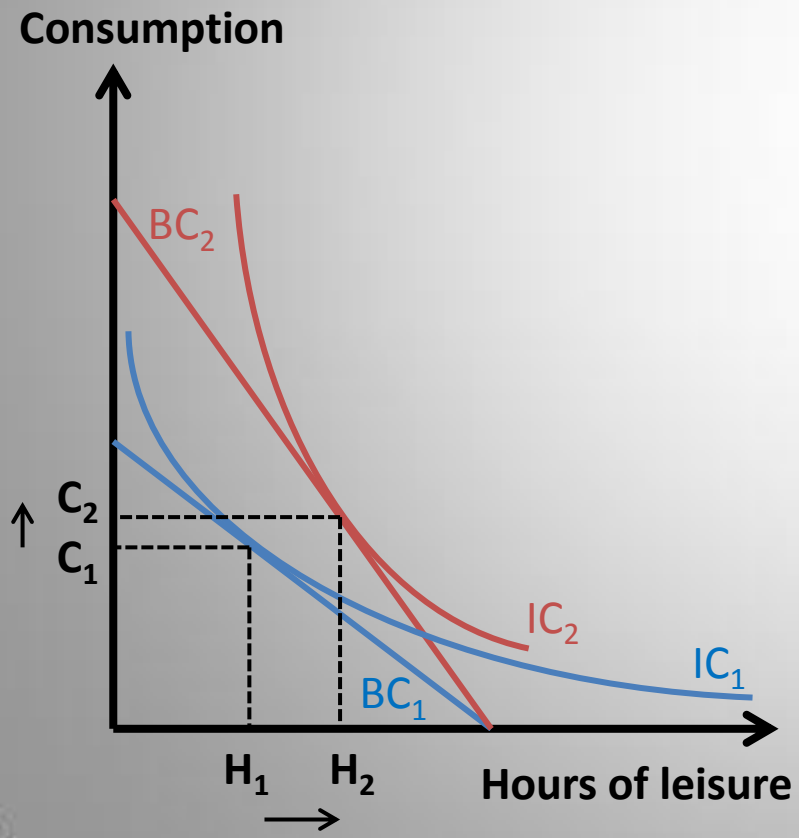
- Analyze the optimal choice between # of hours worked and leisure. There are 2 cases.
- Suppose that the wage rate increases.

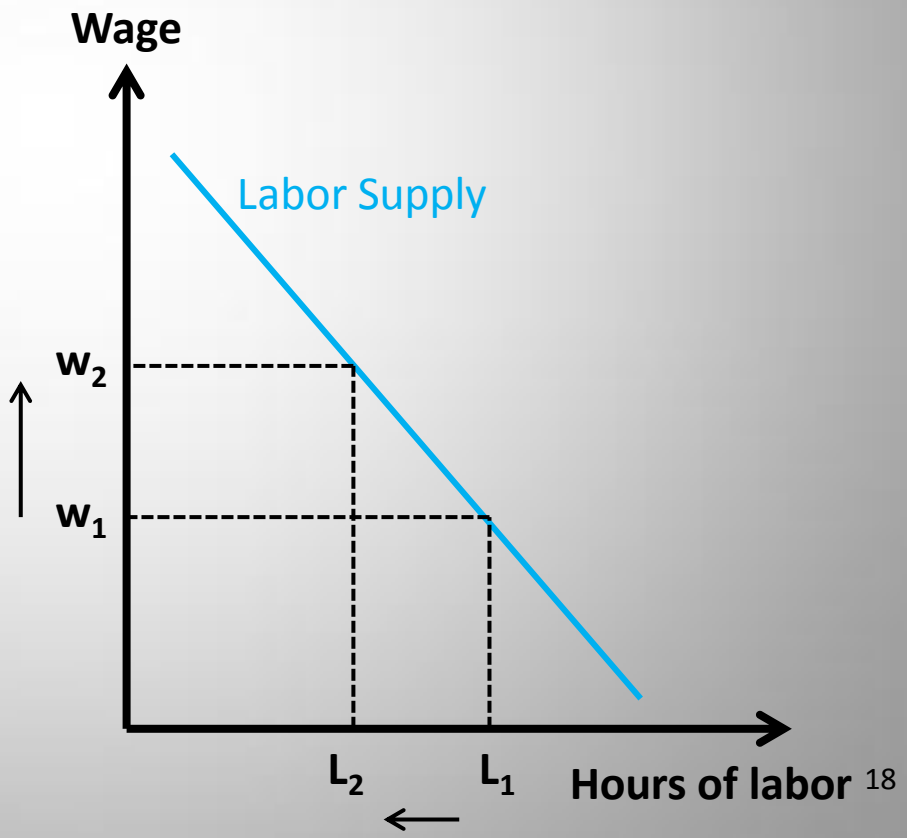




Consumer theory revisited (2)

- Analyze the optimal choice between # of hours worked and leisure. There are 2 cases.
- Suppose that the wage rate increases.

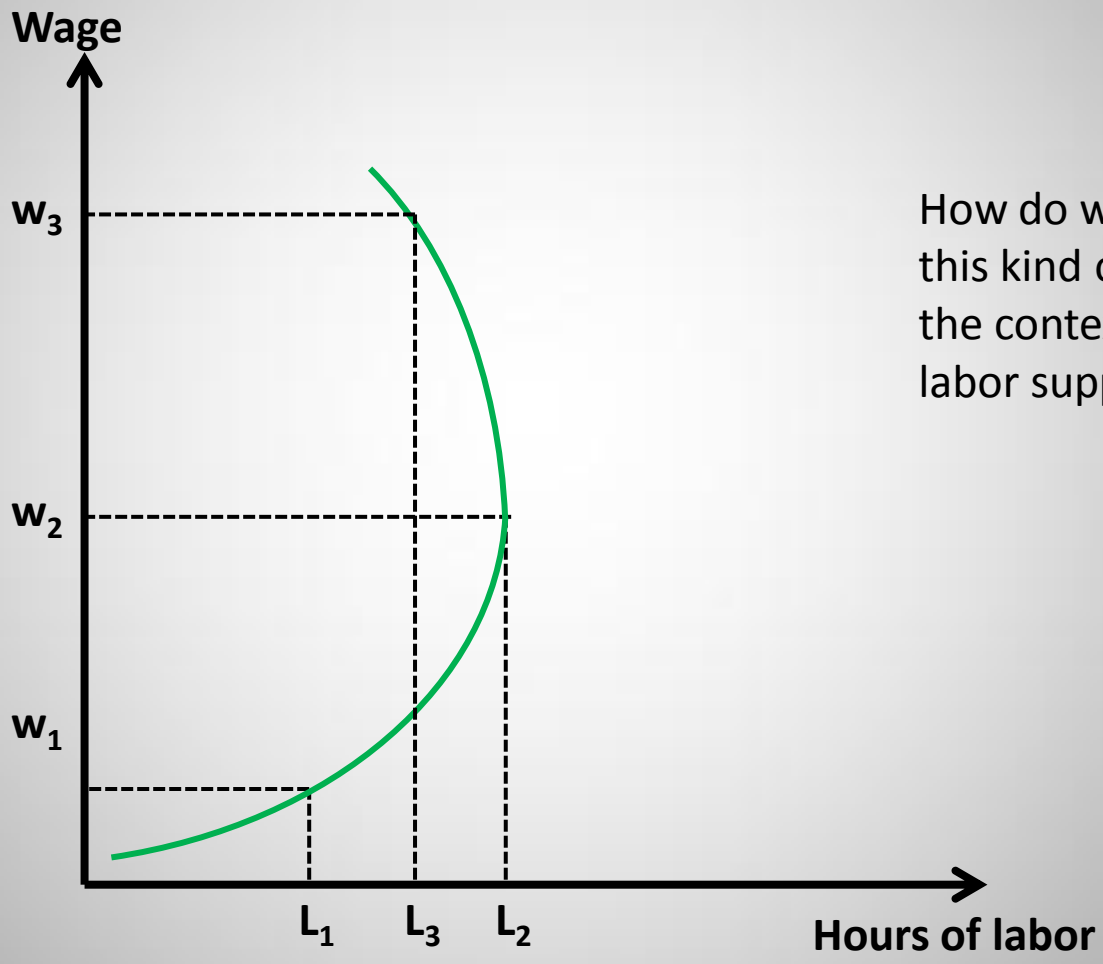




Consumer's supply of labor

- In the first case, leisure is a inferior good – despite an increase in income, the consumer "buys" less leisure and hence supplies more labor.
  - Substitution effect dominates the income effect.
- In the second case, leisure is an normal good – as income goes up, the consumer "buys" more leisure hence giving up some of the consumption good. As a result, the hours of labor supplied decrease.
  - Income effect dominates the substitution effect.
- In the real world, we often observe a phenomenon of the backward-bending labor supply curve.

Backward-bending supply curve



How do we interpret this kind of shape in the context of the labor supply?

Shifters of the labor demand and supply curves

- Demand shifters:
  - Output Price
  - Technological Change
  - Supply of other Production Factors
- Supply shifters:
  - Changes in Tastes
  - Changes in Alternative Opportunities
  - Immigration

Example: market for professional athletes

- Suppose the labor supply is perfectly inelastic.
  - Minimum salary of an NBA rookie is ~$480 000!
- What happens to the equilibrium wage when television advertising payments to the league increase?
- Show this on a graph!

Equilibrium in the labor market

- Having analyzed the demand, supply and the factors that shift them, we can put up the complete labor market equilibrium, determined by an equilibrium wage and the corresponding number of hours employed.
- An important issue in the labor market is the minimum wage policy – this is effectively a price floor in the labor market.
- Similarly, we can analyze the effects of introducing labor taxes on the equilibrium employment.
- Make sure that you review these topics from the first part of the course ☺

Real Wages and Productivity

- What happens to Average Real Wages over time in the United States?
  - Real Wages means that they are adjusted for inflation.
- Before looking at the table, let's define average Labor Productivity as Total Output in a year divided by Total Hours Worked.
- Now look at the growth in average wages and the growth in average labor productivity.

Productivity and Wage Growth

Time Period	Growth Rate of Labor Productivity	Growth Rate of Real Wages
1959-2009	2.1%	1.9%
1959-1973	2.8%	2.8%
1973-1995	1.4%	1.2%
1995-2009	2.6%	2.3%

Table 2 in Chapter 18 of Mankiw (averages of annualized rates of change)

- We can see a clear pattern here that wage growth is associated with productivity growth.
- What is the source of labor productivity growth?
- Main source: technological change.

Differences in wages (1)

- That was it about average wages. Next, let's discuss the differences in wages across workers.
- First factor:
  - Compensating Wage Differentials
    - People with the same skills tend to get different pay if they work at jobs with different characteristics. More dangerous, unpleasant jobs tend to get higher pay (everything else kept the same).

These guys probably get a little extra…

Other examples?

Compensating Wage Differentials

- For the economics professor job, you get higher pay teaching in a business school rather than an equal regular economics department, particularly for entry-level jobs (new PhDs).
- We have new PhDs in our program turning down higher pay in a business school to take a job in a regular economics department. Why?
- Opportunity to teach PhD students in a regular department is very valuable for one's research career (and later earnings).

Differences in wages (2)

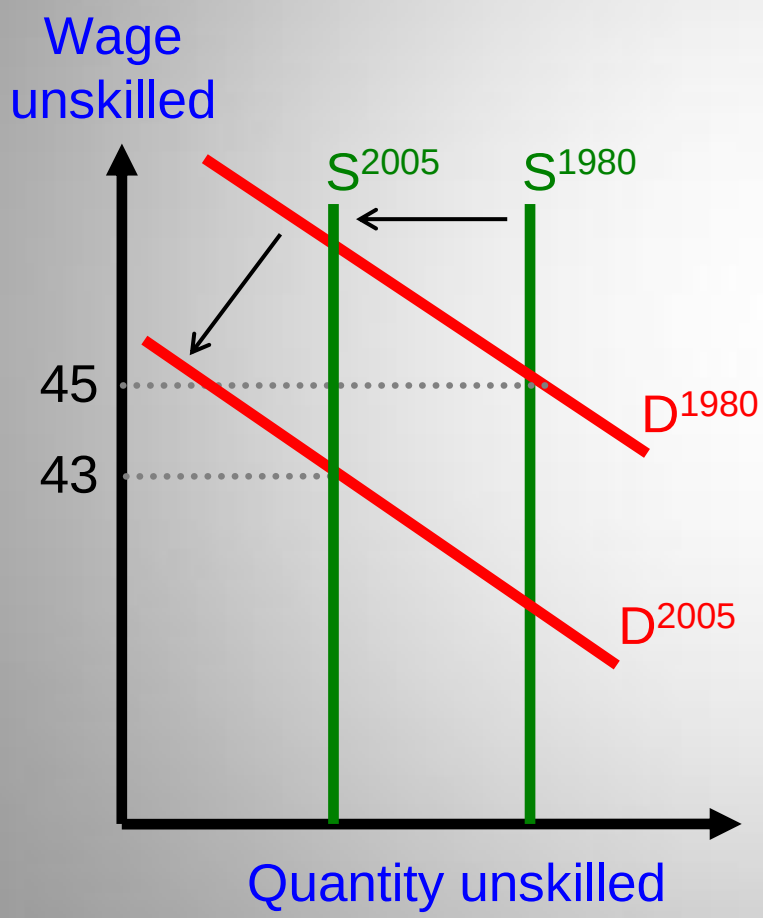
- Second factor:
  - Workers differ in the amount of human capital they have acquired (that is skills/education).
  - Workers with more human capital tend to get higher wages.
  - Let's look at some data and verify whether this is really the case.

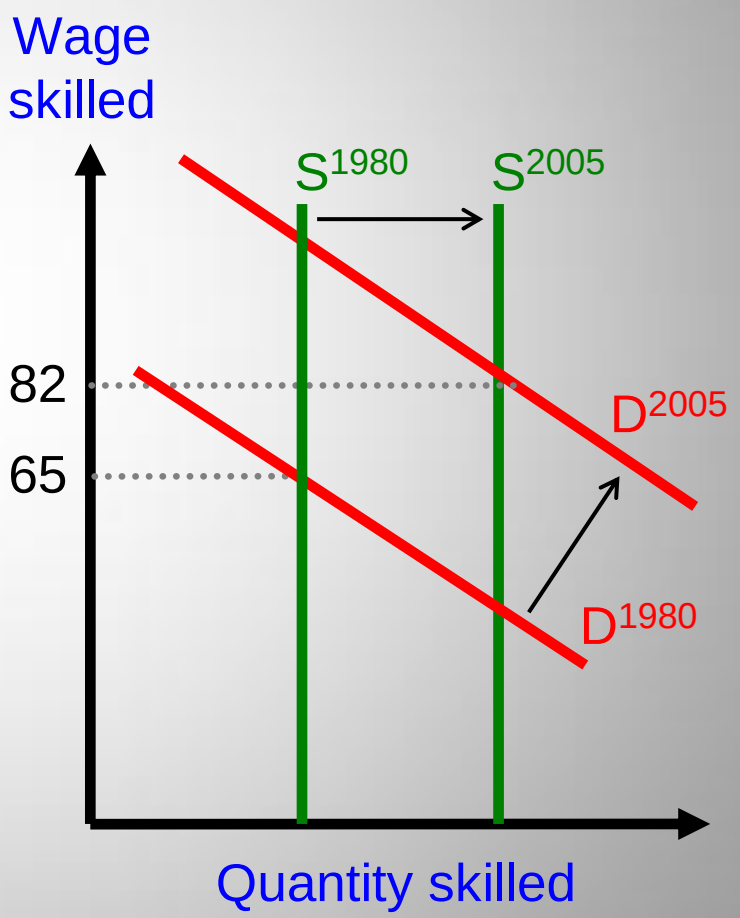
- Skill Premium: Pay difference between skilled and unskilled labor (in table, this is the % extra for college grads)

	1980	2008
Men		
High school	45,310	43,493
College	65,287	81,975
Skill Premium	**44%**	**88%**
Women		
High school	27,324	31,666
College	36,894	54,207
Skill Premium	**35%**	**71%**

Table 1 in Chapter 19 of Mankiw ($1,000 at 2008 prices)

Supply and demand for skilled and unskilled workers





Why has the demand for skill gone up relative to demand for unskilled labor?

- We will analyze a list of potential factors.
- All of these matter, but we won't be able to settle anything today about the relative importance of different factors.
- Take another economics class to learn more!

Factor 1: Skill-Biased Technological Change

- New innovations are complements for skilled labor, but substitute for unskilled labor. Impact on demand?
- To understand the skill-biased technological change, think about the invention of a robot that can spray paint on a car or tighten a bolt on an automobile assembly line:
  - The robot is a substitute for the unskilled worker on the assembly line.
  - The robot does not do the creative work of designing the car. The skilled worker continues to do that job. The skilled worker designs the car and the robot builds it. In that way, the robot complements the skilled worker.
- As another example, think about the further development of web-based teaching. This complements the skill of Greg Mankiw, as he can now leverage up his skill to potentially teach tens of thousands of students in economics classes across the country. And become a substitute for "lower-skilled" professors or graduate students ☹

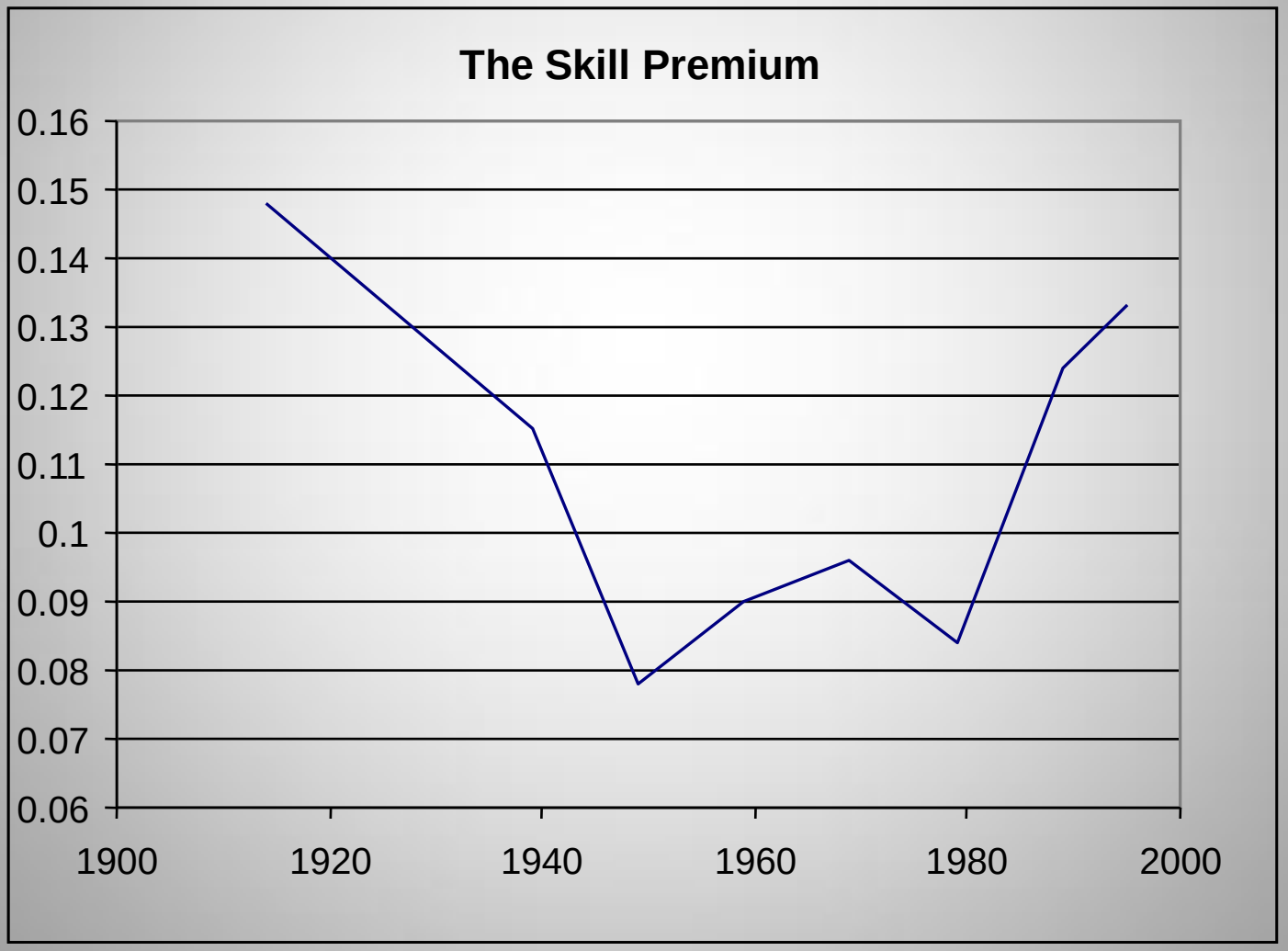
- The issue of how the internet (and communications technology more generally) impacts the return on being the best is called the Economics of Superstars.

- Example: Suppose there is no internet, television or radio. If you want to hear someone sing, you have to hear them sing live. The very best singer in the world will be limited in how much he or she can earn: only what the best singer can charge from having people listen at a live concert. The 2nd best, the 3rd best, the 100th best singer probably won't make much less than the 1st best, because the 1st best can't really go around the world and give everyone a live concert.

- But now think about what happens when new technologies (like recorded music) emerge that make it possible for the best singer to sell music to everyone. No one will be interested in listening to the 100th best anymore. Things move to a case where 1st best gets everything and 100th best gets nothing ("winner takes all").
- We will talk about widening inequality even at the top of the income distribution (the "have mores" pulling away from the "haves" and the "Economics of Superstars" is one explanation).
- You can listen to Greg Mankiw talk about this at Aplia (online chapter 19-1e).

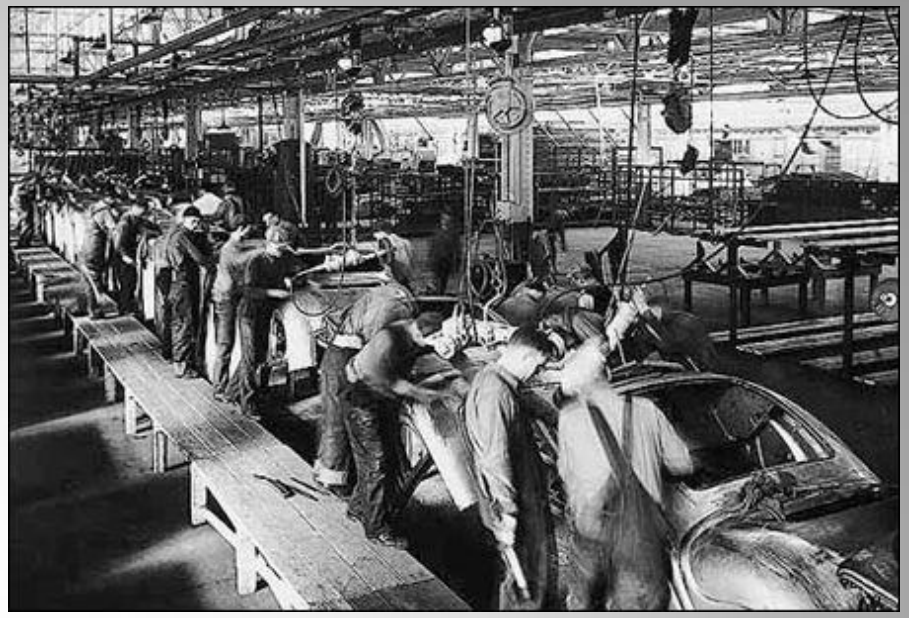
- It is interesting to contrast the recent trend of "Skill-Biased Technological Change" with the trend earlier in the 20th century.
- Skilled worker at that time: skilled craftsman who has learned a trade after a long time of apprenticeship.
- Unskilled worker: Hands and arms connected with a strong back and no questions asked ☺
- Technological change at that time (Henry Ford's assembly line)
  - Take an unskilled worker and put him on the assembly line. He'll be up to speed in a few days. So this is an unskilled-biased technological change. In this period there was a decline in the skill premium.

Longer Term Trend
(% return per year of schooling)



Ford assembly plant in St. Paul that closed just recently (picture from 1935).

Note that these unskilled workers are being replaced both by machines operating in the US and low-skill workers in other countries.



Auto factories today.

Note that many things are still being manufactured in this country, but employment is way down because machines have replaced assembly workers.

- The next frontier: computers replacing the jobs formerly done by high skill workers.
  - e.g. artificial intelligence read law cases, x-rays, etc.

- So, is technological progress a bad thing?
  - Gutenberg invented the first printing press ~1439.

    Beforehand, a team of monks would spend weeks making a single hand-written copy of some book.
- What about the people who get laid-off?
  - Enter the industry with high demand for unskilled labor
  - Acquire more skills and stay in the same industry as a skilled and experienced worker.

Factor 2: Expansion of trade and immigration

- Why should that raise the skill premium in the US?
  - In the United States, the ratio of skilled workers to unskilled is quite high relative to the rest of the world. With an expansion of trade, we tend to export goods with high skill content (e.g. pacemakers and high tech goods) and imports goods with low skill content (like hand sewing of sneakers). With an expansion of trade, the demand for unskilled labor declines in the US. This happens because of the increased availability of substitute products made by the vast number of unskilled workers throughout the world. With an expansion of trade, the demand for skilled labor tends to increase in the United States. As the United States specialize more in high tech and other industries that emphasize creativity, demand for skilled labor goes up.

Factor 3: Decline of Trade Unions

- This is a change in market power of the unskilled workers, rather than a demand shift.
- Unions have declined significantly over the past 30 years. Production (or “blue collar”) jobs are much more likely to be unionized than “white collar” jobs such as management.
- In the 1950s and 60s, when the skill premium was the lowest, the percent unionized was the highest.
- Next part of this lecture will be dedicated to unions…

The 99% and the 1%

- Next, look at increasing inequality even within the upper range of the income distribution. The "haves" are starting to complain about the "have mores".
- If you are interested, there's recent research about this from Piketty and Saez:
  - http://elsa.berkeley.edu/~saez/pikettyqje.pdf
- They use tax return data to estimate the distribution of income at the very top.
  - Strong evidence that "have mores" are rising relative to the "haves".

Let's look at the figures

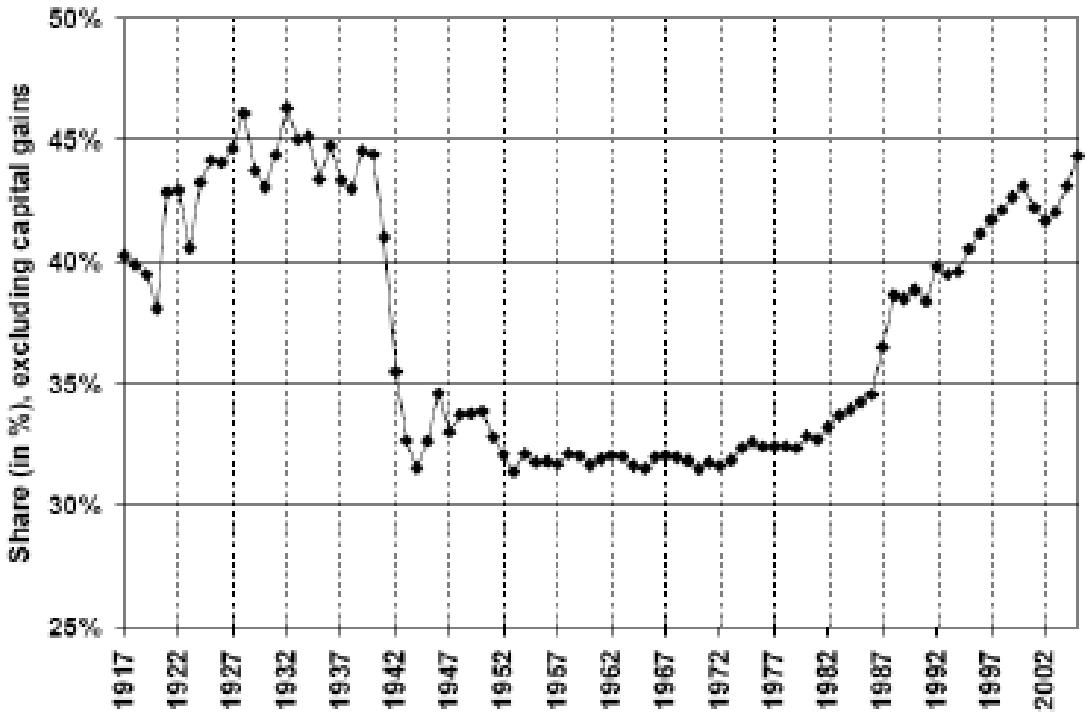


FIGURE 1
The Top Decile Income Share, 1917-2005

- You can see in the figure that the top 10% of income earners had the following shares of income:

Year	Share of Total Income	Income Relative to Average
1917	41%	4.1
1972	32%	3.2
2005	45%	4.5

- So there's a nice relative raise going from 1972 to 2005, ranging from 3.2 times the average income to 4.5 times the average income.
- Next, let's look at the "have mores", the top .01%

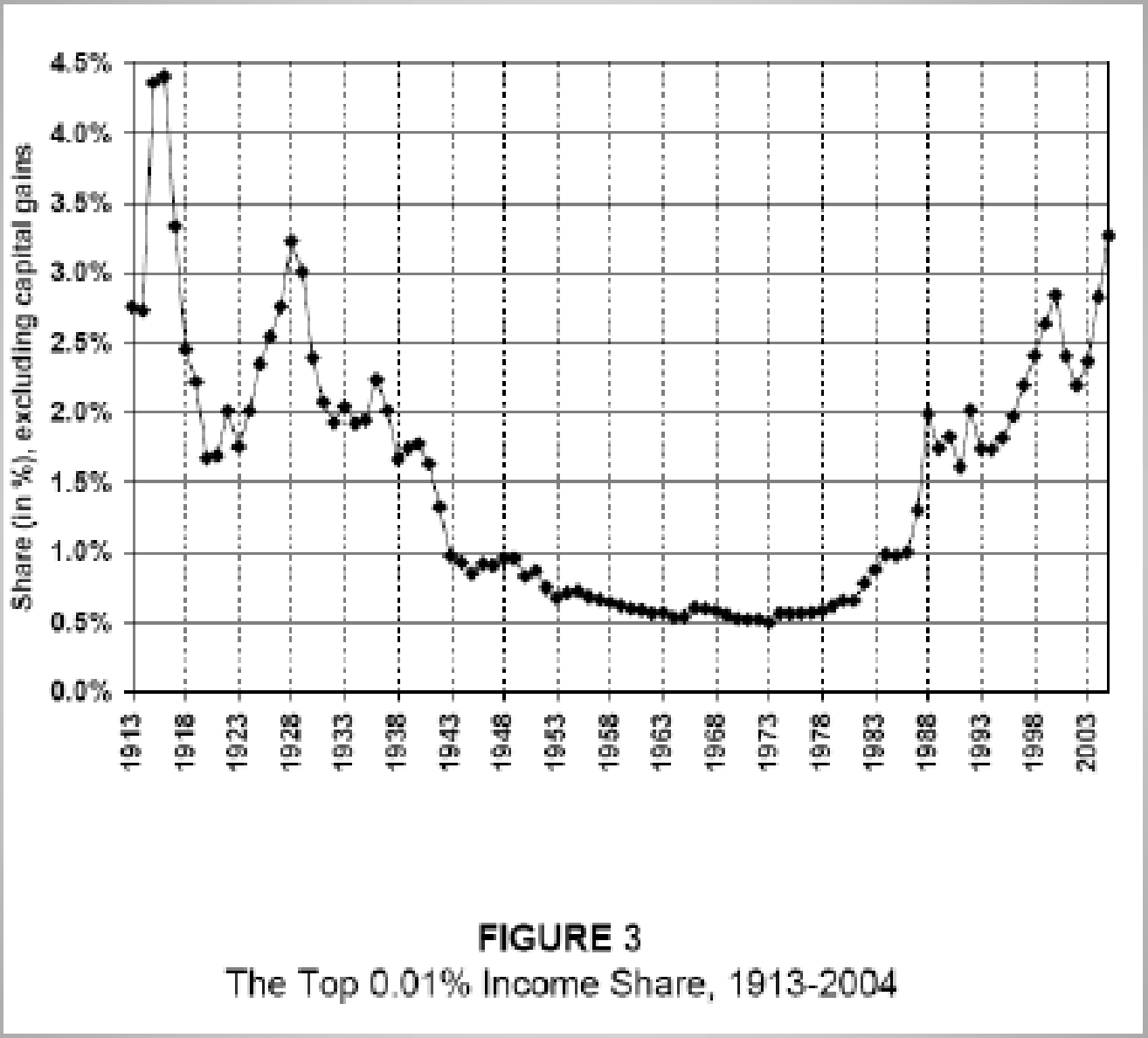


FIGURE 3
The Top 0.01% Income Share, 1913-2004

- You can see in the figure that the top .01% of income earners had the following shares of income:

Year	Share of Total Income	Income Relative to Average
1913	2.7%	270
1972	0.5%	50
2005	3.3%	330

- So there's a fantastic relative raise going from 1972 to 2005, ranging from 50 times the average income to 330 times the average income.

Explanations of this phenomenon

1. (Supply and Demand)
   - "Extreme Skill-Biased Technological Change"
     - Benefiting workers way out at the extreme ending of the talent distribution.
   - Return to very special talent has gone up, economics of superstars (easier to leverage up talent).
2. Return to special talent always there, but social norms limited pay differences.
3. Looting: the .01% have figured out a new way to work the system to redistribute the economic social pie to themselves, including busting unions.
   - Occupy Wall Street explanation.

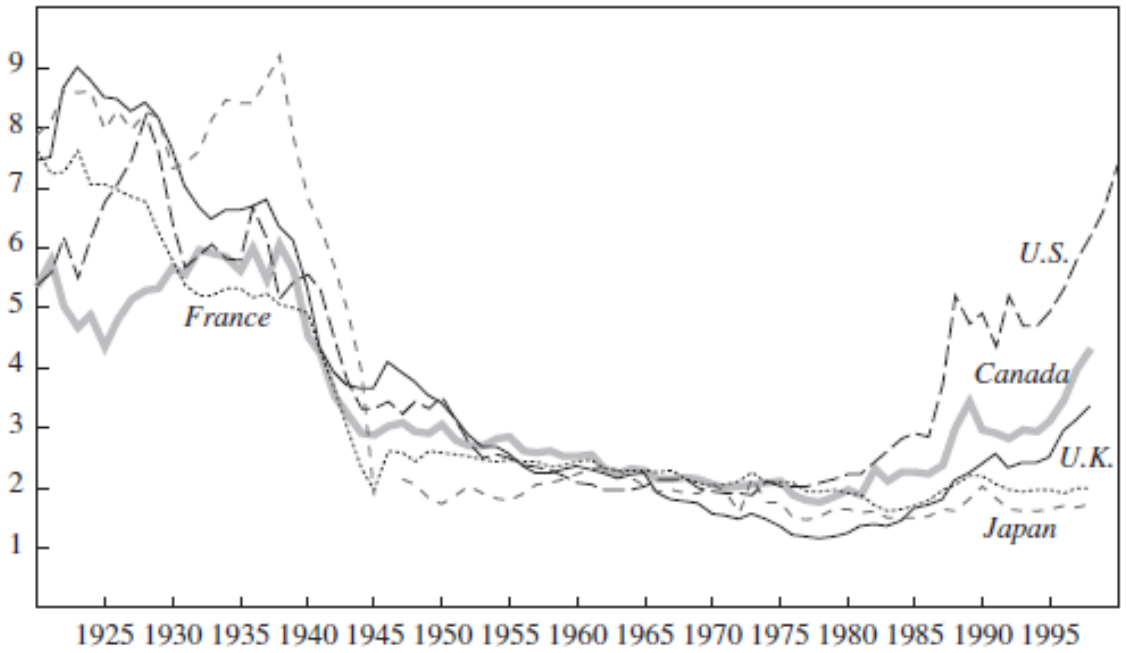
Look at Theory 1: Return to Talent

	Hank Aaron 1972	Alex Rodriguez 2007
Salary ($)	200,000	28,000,000
GDP p.c. ($)	6,000	44,000
Ratio	33	636

Analogous forces going on with CEOs, globalization, multinationals…

We can observe similar pictures when we add other countries as well

Figure 3. Share of the Top 1 Percent in Total Income in Selected Industrial Countries, 1920–2000[a]



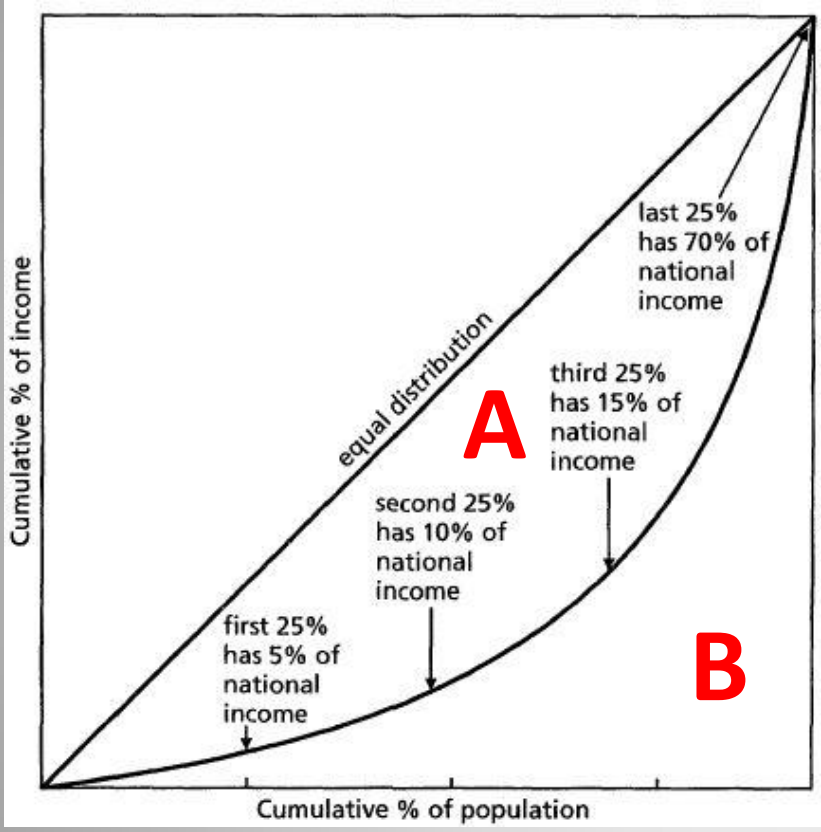
Source: Piketty and Saez (2006b).
a. Total income includes labor, business, and capital income but excludes capital gains.

As cited in Gorden and Dew-Becker, "Selected Issues in the Rise of Income Inequality".

- The graph is very interesting – in terms of the several past decades:
  - "Anglo-countries" (i.e. US, Canada, UK)
    - Canada is "US light"
    - UK is "US lighter"
  - Japan and France are completely different.
- If this is all Skill-Biased Technological Change, why are the Anglo-countries different?
- One possible explanation: France is not paying market wages.
  - Interesting article about "brain drain" of academics to the United States:
  - http://www.nytimes.com/2010/11/22/world/europe/22france.html
  - Percent of French émigrés to the US that were academics:
    - 1971-1981: 8 percent
    - 1996-2006: 27 percent
  - Many reasons for this, one of them is salary.
    - A French biologist who moved back to France had to take a ⅔ pay cut.

- France trying to raise the top marginal tax rate to 75% this past September won't prevent the migration of people with high earnings potential.
- Nonetheless, the new French president is still trying to pass this proposal.

Another method of analyzing inequality



Source: *McGraw-Hill Science and Technology Dictionary*

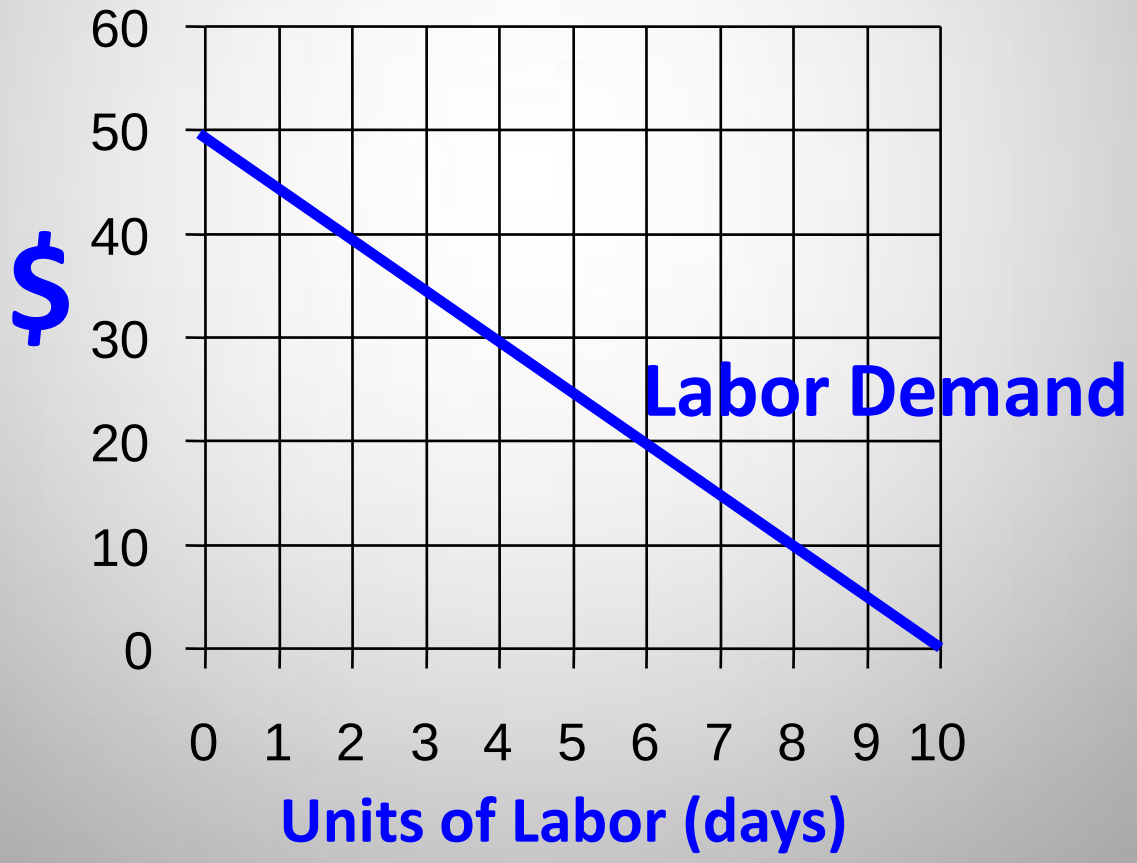
Lorenz curve: shows the degree of inequality in the distribution of some variables. In this case, it is used to present how unequally income is distributed within a society.

Gini coefficient: shows how unequally one variable is distributed relative to another. It takes the values between zero ("perfect equality") and one ("perfect inequality").

The Gini coefficient can be calculated using the areas marked by the Lorenz curve. The 45-degree line would be the curve under perfect equality. Hence, the Gini coefficient is equal to: A/(A+B). We usually express it in %.

Unions

- Union in our sample economy:
  - Remember that we have derived the demand for labor in the previous part, where the price of output was $2.



- Suppose the unit of labor is a “Day” (i.e. a firm demands days of labor).
- Suppose the competitive price of labor is $10 a day.
  - Clearly, the producer will demand 8 days of labor.
- Now suppose the plant is organized by a trade union.
- Suppose the union negotiates a wage hike to $20 a day, but the firm is still in charge of running the plant (and picking employment size).
- The firm will respond by demanding _____ days of labor.

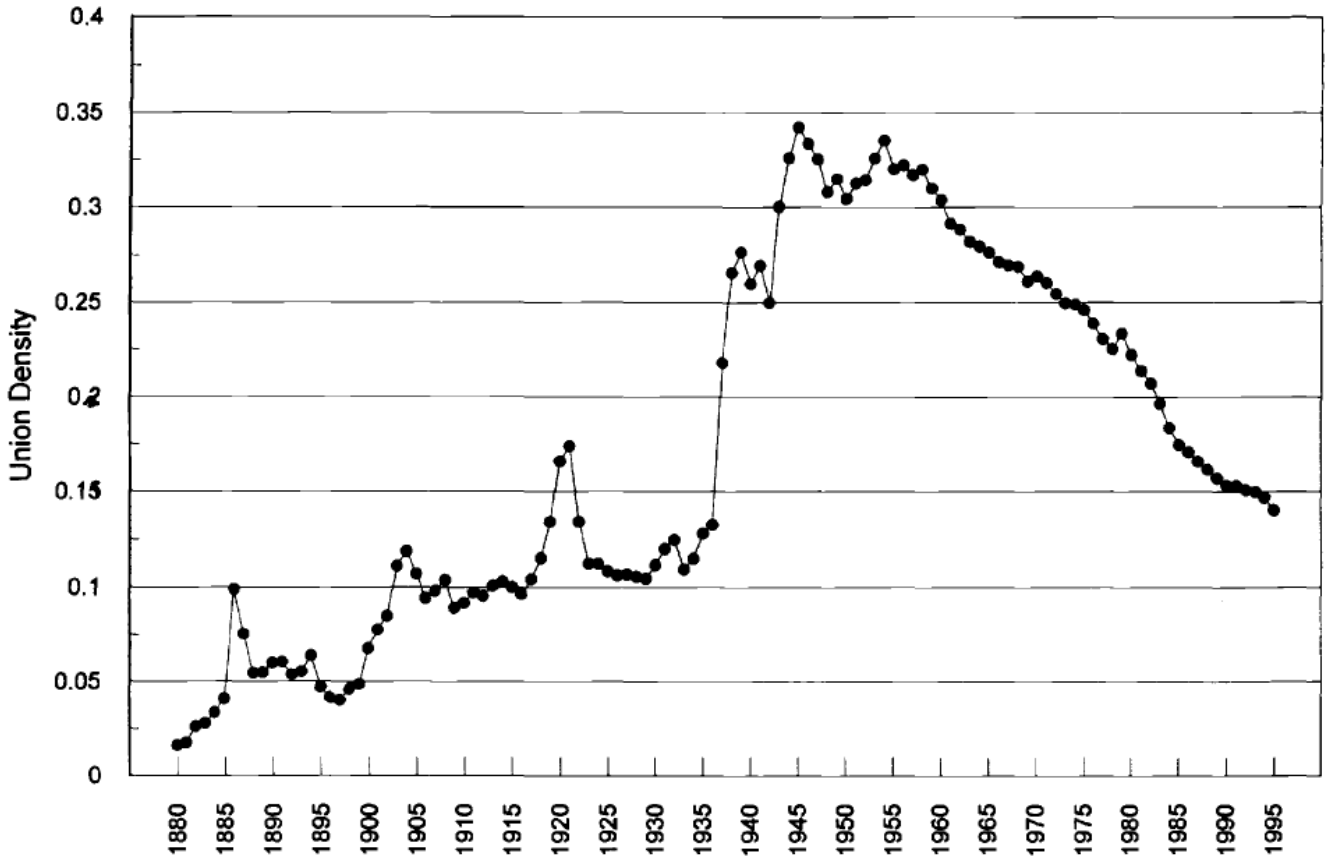
- Suppose the unit of labor is a “Day” (i.e. a firm demands days of labor).
- Suppose the competitive price of labor is $10 a day.
  - Clearly, the producer will demand 8 days of labor.
- Now suppose the plant is organized by a trade union.
- Suppose the union negotiates a wage hike to $20 a day, but the firm is still in charge of running the plant (and picking employment size).
- The firm will respond by demanding **6** days of labor.

- Suppose there are 8 workers initially in the plant who share the reduced work.
- If the workers take off one day out of every four days, there will be 6 workers in the plant every day, which is what the firm demands at a wage of $20.
- Average take-home pay: (3/4)x$20 = $15.
- And one day off out of four!
  - Of course the workers like this deal.

The US case now

- The benefits to workers of a union are not that quite extreme: the textbook cites an average pay differential of 10% to 20%.
- A bit of history: There were violent early strikes (1892 Homestead Strike in the steel industry), but unions didn't make a lot headway until the law changes in 1935 (Wagner Act), making it easier for unions to achieve formal recognition and forcing companies to bargain with them.
- Let's look at a graph of the fraction of workers in the US represented by Unions.

Figure 1: Changing Percentage of Non-Agricultural Workers Who Are Members of Unions, 1880-1995

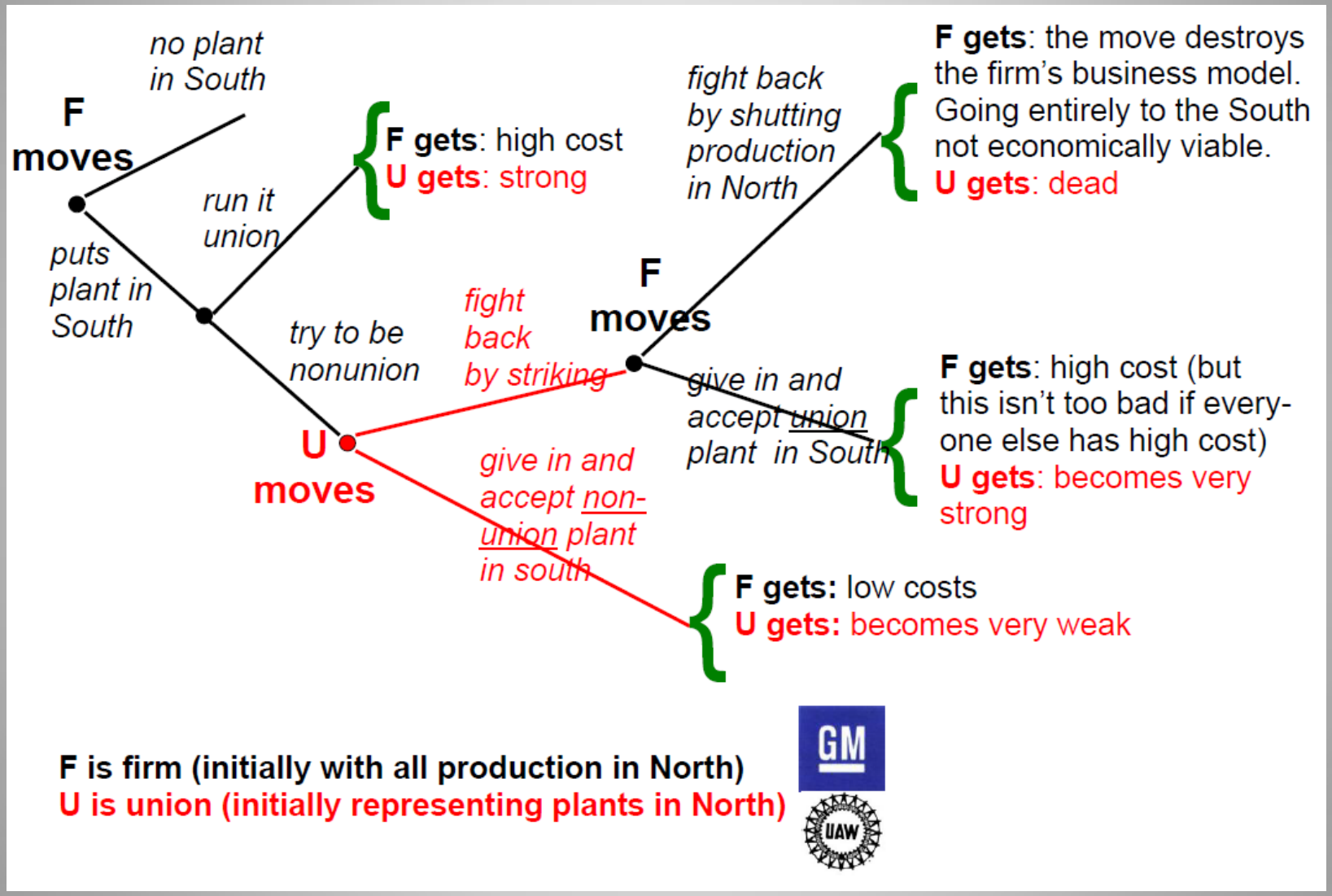


Observe the steady decline since the maximum point of 35% in 1950.

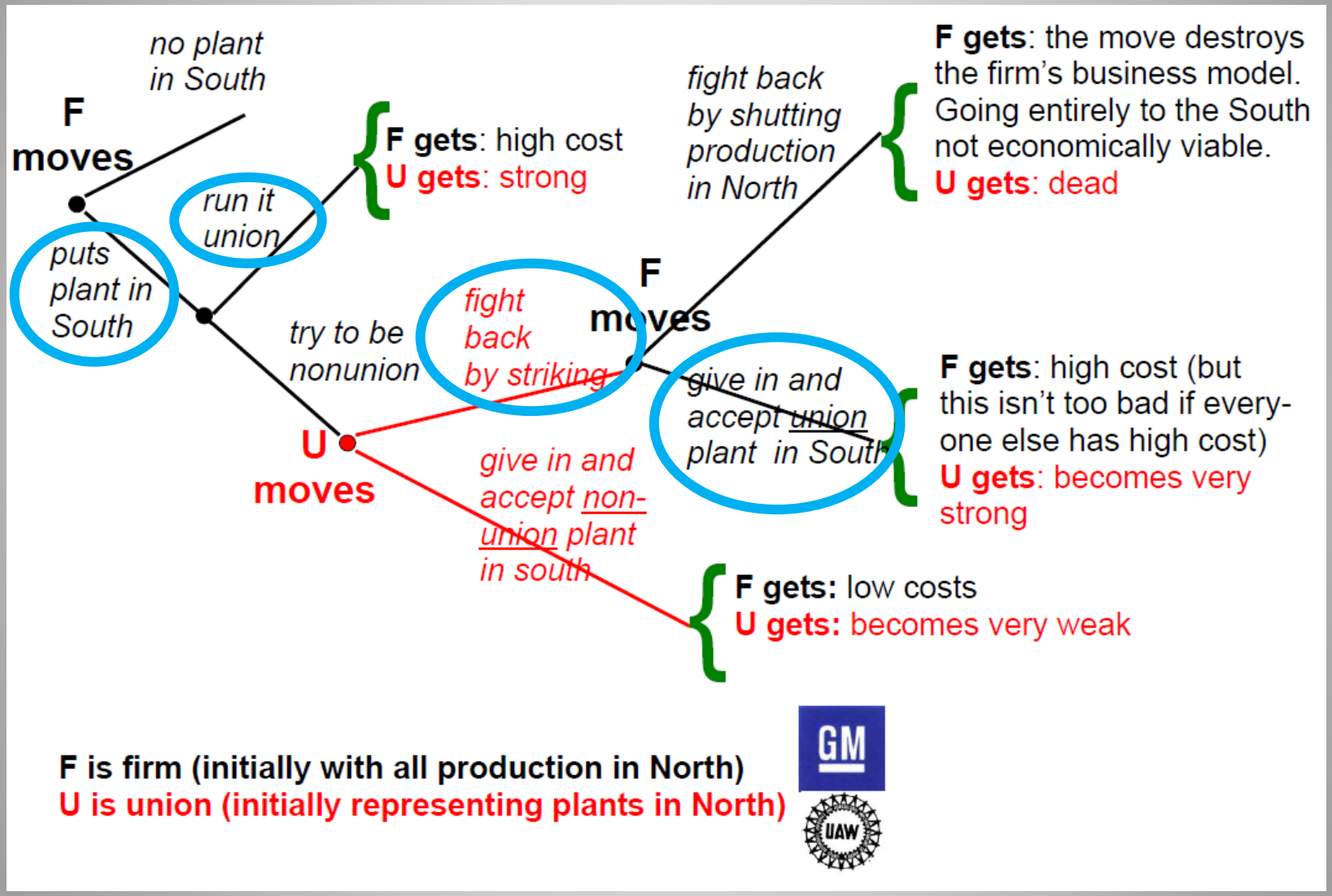
- There are lots of factors behind this decline, including a shift of industry composition from manufacturing to services (and within industries from blue collar to white collar).
- Unions don't have much bargaining power left.
  - In 1960s, GM and Ford tried to open plants in the South of the US where unions are weak. The United Auto Workers (UAW) forced GM and Ford to accept unions in the southern plants.
  - By 2010, Boeing had a nonunion plant in South Carolina (has reputation for most hostile state for unions). Boeing still has huge operations in Washington State represented by the Machinists. But if the Machinists make trouble, they have to worry about even further shutdowns in Washington. They don't have the kind of leverage the UAW had over GM and Ford in the 1960s. (no way GM and Ford were going to move out of Michigan).
  - There was a really interesting development in this case in April 2011. Let's ignore this development for now and then come back to it.

- We can use game theory to understand the interactions between a firm and a union.
- Let's set up a Game Tree to specify the moves of the players and the order that the moves take place. The game tree also specifies how the payoffs depend on what takes place.
  - For simplicity, we use words rather than converting the payoffs to numbers.
- We look at the game tree for GM in the 1960s and for Boeing in 2010. We assume each player is forward-looking and takes for granted that other player will act rationally, given the decisions previously made.

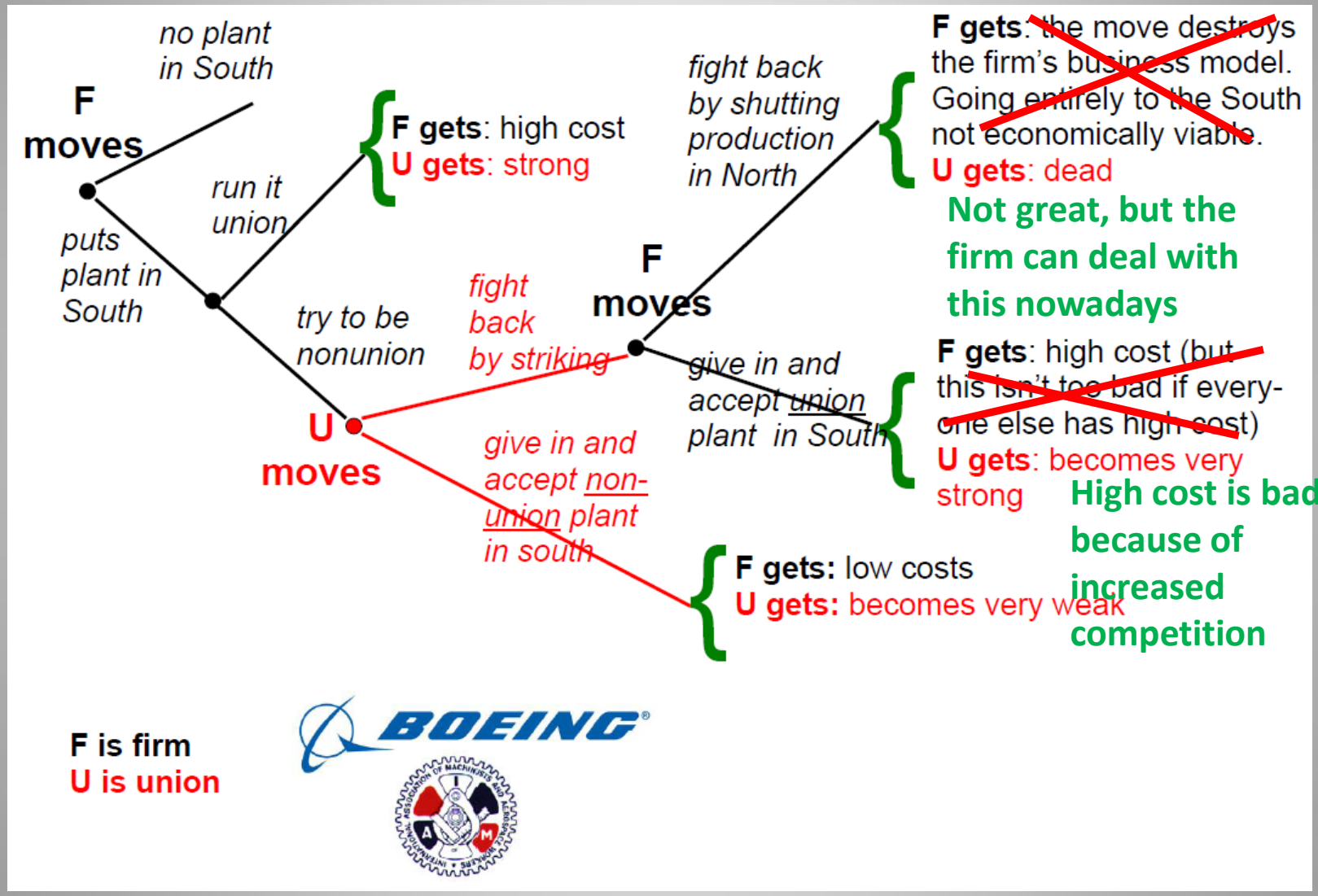
Game Tree for Auto Companies in 1960s



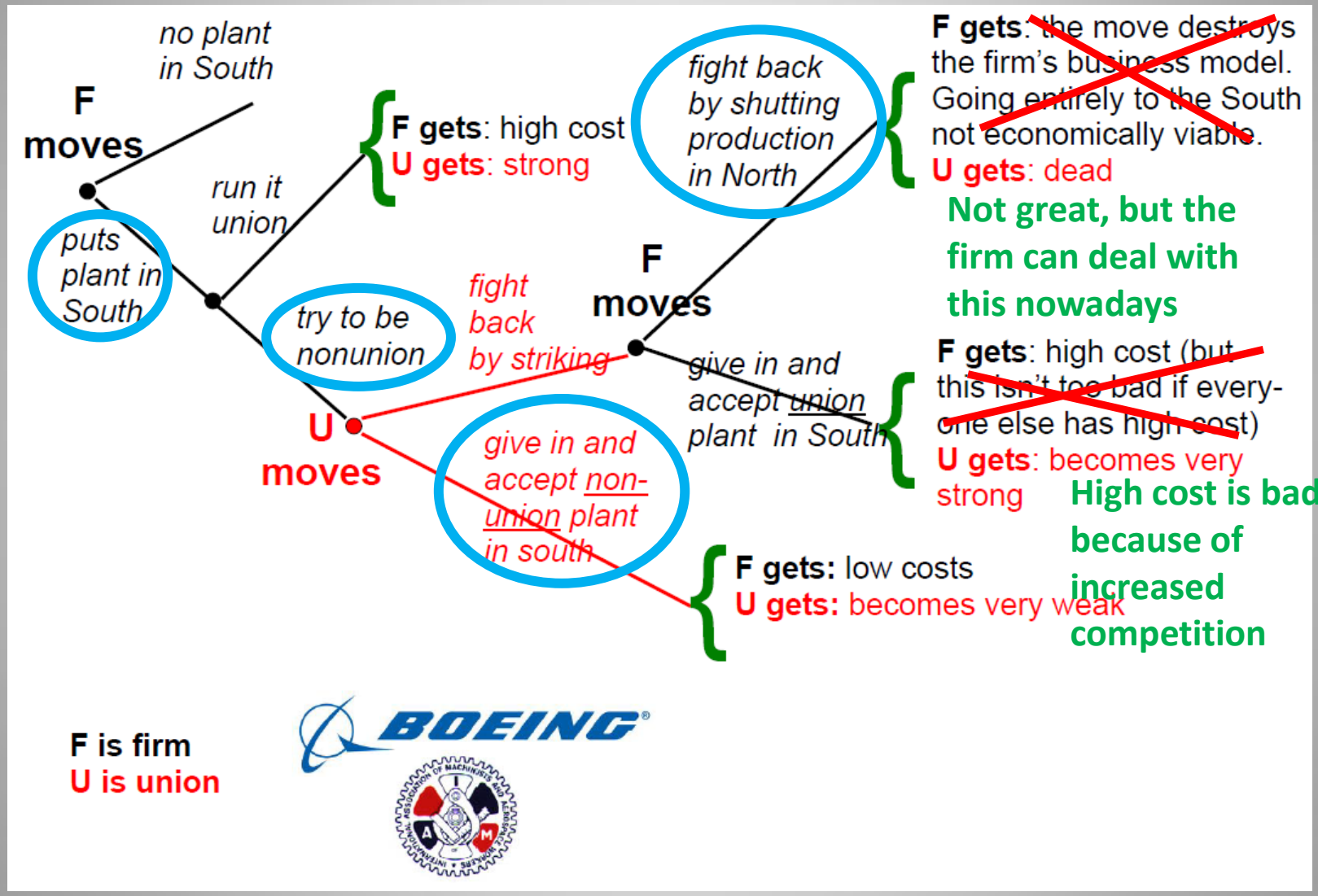
Game Tree for Auto Companies in 1960s



Changes in Game Tree for Boeing in 2010



Changes in Game Tree for Boeing in 2010



- What is the equilibrium sequence of outcomes for GM in the 1960s?
  - Last stage: GM chooses to give in and accept unions.
  - Second to last: Union chooses to fight back by striking.
  - Seeing that, GM will just pick to run the firm with a union in the second stage.
  - In the first stage, let's assume that GM has an incentive to expand to the South.
- What about for Boeing in 2010?
  - Last stage: Boeing picks to fight by shutting production in the North.
  - Second to last: Union sees that if it fights, they will die. So they give in.
  - Boeing, knowing this, will choose to run the firm without a union.

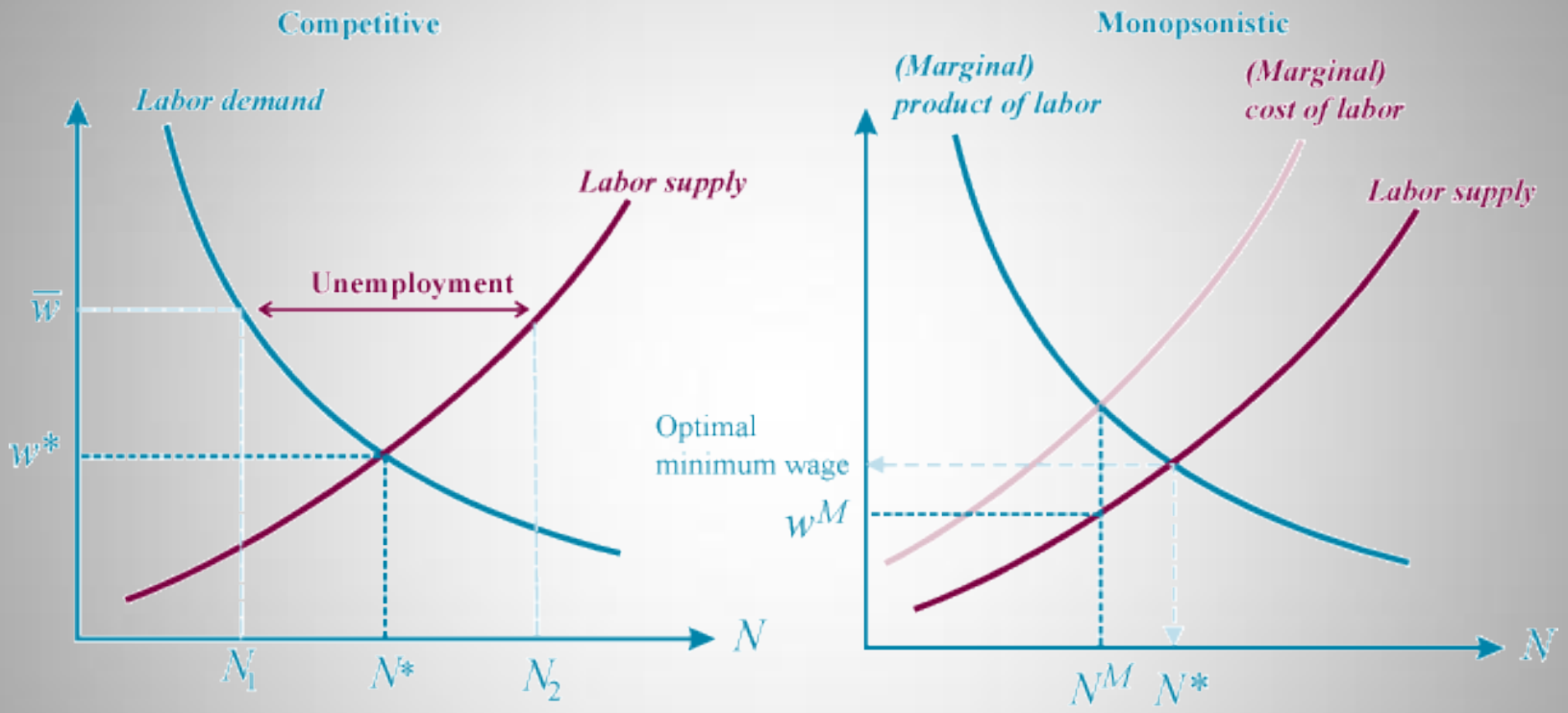
New Development

- In April last year, the union successfully got the government to come in on its side.
- National Labor Relations Board (NLRB) sided with the union that the way Boeing moves to the south was an “unfair labor practice”.
  - Because the executives said they were sick and tired of strikes and that’s why they did it. If management had never said that stuff, the union wouldn’t have had a case.
- NLRB actually held up production starting at the South Carolina plant. All this was going to court but…
- Boeing has a lot of plane orders and didn’t want any more delays. They have settled the case with the union and will be adding more (union) production in Washington in return for the union dropping the charges regarding the South Carolina plant.

Modeling a trade union

- Suppose we have a very strong trade union, able to influence the company's decisions.
- Notice that we can treat this union as a monopolist in the local labor market (the only supplier of labor force).
- Then, in order to find the wage rate that the union will try to enforce, we need to consider the standard problem of a monopoly and find the labor amount L* such that w*=MC=MR.
- As a result, we end up in an inefficient allocation, with very high wages and only few workers employed.
- How about the opposite situation?
  - what if a firm is the only employer in the local community?

Monopsony in the labor market



A monopsonist chooses the number of employees by equating the marginal revenue (value of the marginal product of labor) with the marginal cost of labor, derived from the labor supply curve.
The allocation is inefficient, just as with monopolies.

Source: Rochetaeu, G., Tasci, M., The Minimum Wage and the Labor Market, Economic Commentary, Federal Reserve Bank of Cleveland 2007

Summary

Why do people receive different wages?

1. In competitive labor markets, people with the same skills will receive different wages if working conditions vary (Compensating Differentials).
2. In competitive labor markets, people with different skills and ability will get different wages (as wage includes a return on human capital).
3. If labor markets are not competitive, workers of equal ability might receive different pay. For example, a union worker might receive 20% more than someone doing the same job with the same skill level.

Labor Market Discrimination (1)

Median Annual Earnings by Race and Sex

	White	Black	% earnings are lower for black workers
Men	47,370	37,253	21%
Women	36,198	31,509	13%
% earnings are lower for women workers	24%	15%	

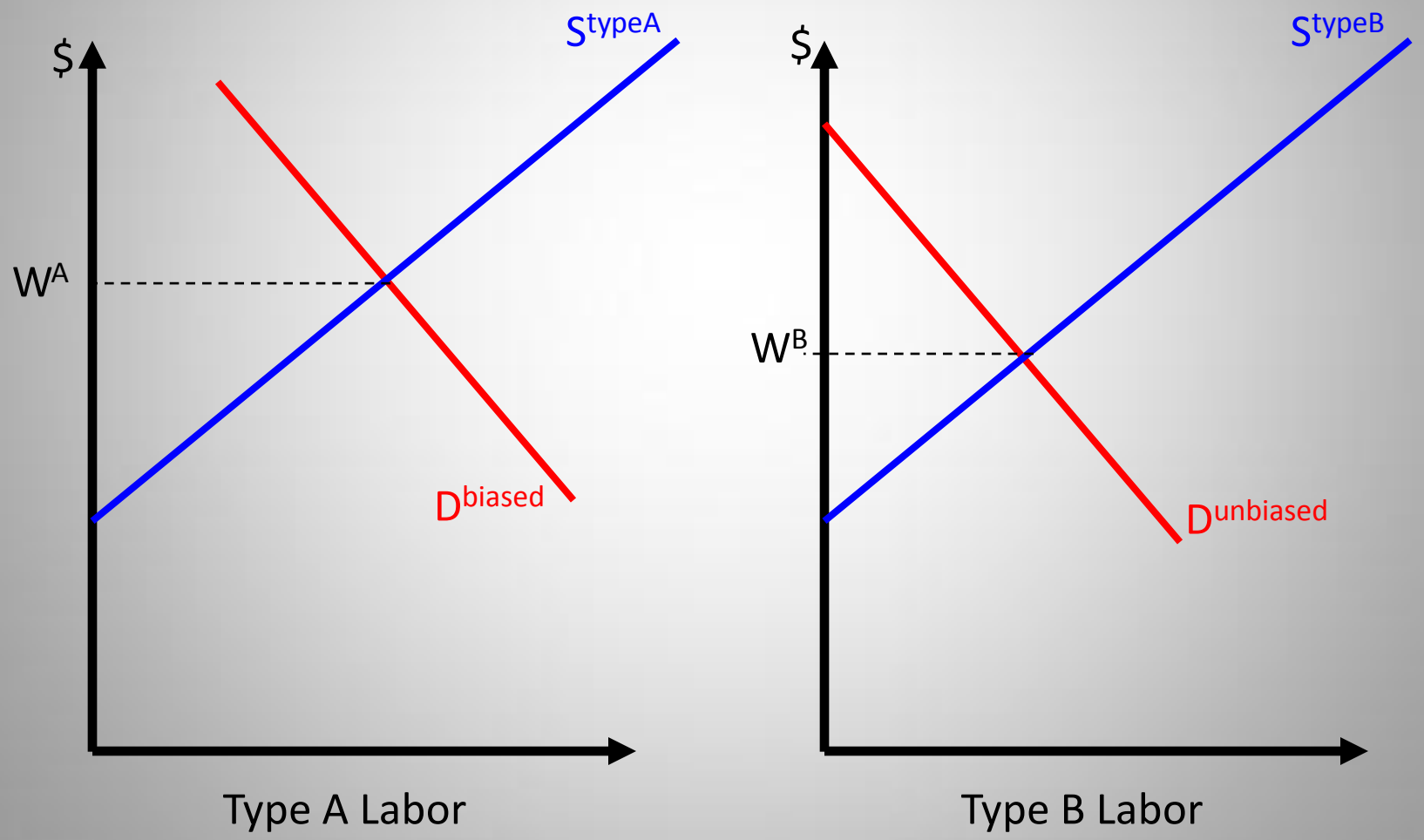
Note: Earnings data are for the year 2008 and apply to full-time, year-round workers over the age of 14.

Source: Table 2 in Chapter 19 of Mankiw (originally form US Census Bureau).

Labor Market Discrimination (2)

- Suppose there are two kinds of workers: type A and type B and they have equal ability.
- Suppose there are two kinds of firms, biased and unbiased.
  - Biased firms refuse to hire type B.
  - Unbiased firms don't care and will hire whichever type is cheapest.

So the equilibrium in such labor market might look like this



- We can see that in equilibrium $W^B < W^A$.
- How can this be?
  - Biased firms know they can pay less to type-B workers, but they refuse to hire them. The wage W^A is where the demand for type A workers by biased firm equals all of the supply.
- Since $W^B < W^A$, unbiased firms won't hire any type-A workers, since they are too expensive (or rather than saying the won't hire them; they will offer W^B to both kinds. But only type-B workers will accept these wages. Therefore, W^B is where the supply of type B workers equals the demand from unbiased firms).

- Could we draw things differently and have an equilibrium where $W^B > W^A$?
- NO !!!
  - In the opposite case, type-B workers are more expensive and the unbiased firm will want to hire type-A workers, which doesn't work because the biased firm does not want type B. Hence, both firms will fight for type-A workers and as a result, these workers will demand a higher wage. On the other hand, since nobody wants to employ type B, their wage will decline.
- Bottom line: if some firms are biased, we can have an equilibrium where $W^B < W^A$.

- But now, think about the long run. Since biased firms pay higher wages for the same quality labor, biased firms will have higher average cost than unbiased firms. In the long run, low cost firms tend to drive high cost firms out of the market.
- We conclude: if discrimination is due to preferences by firms, we expect market forces to work towards driving the discrimination out of the market.

- But what if firms themselves don't care about the type of workers, but the firms' customers do? Suppose customers are biased and they don't like buying from a firm that employs type-B workers. Then, these firms will be able to charge higher prices, and so they won't go out of business.
- We conclude: if discrimination is due to preferences of consumers about the kind of workers that get hired, we do not expect market forces to work towards driving the discrimination out of the market.

Recent Evidence on Labor Market Discrimination

- A recent survey methodology has become popular, we will discuss an application of the methodology to study Swedish labor markets.
- Magnus Carlsson and Dan-Olof Rooth, “Evidence of ethnic discrimination in the Swedish labor market using experimental data”.
  - Labour Economics Vol. 14, Issue 4, August 2007, pp. 716-729
  - Similar to a study in the US discussed in the textbook: “Is Emily More Employable than Lakisha”?

- The study sent applications to 1552 job advertisements in Sweden.
  - One set of applications used Swedish-sounding names
  - Another set used Middle-Eastern names.
  - The rest of the resume was the same.

- The callback rate for the Swedish-sounding names was 50% higher than for the Middle-Eastern names.
- The effect was bigger for the lowest-level occupations (that actually have the largest share of immigrant employees).