Request that you should not refuse

- PLEASE SWITCH OFF AND PUT AWAY YOUR CELL PHONES
- LAPTOPS OK IF WORK IS ACADEMIC
- REMOVE BAGS AND OTHER MATERIALS THAT CAN CAUSE DISTRACTION
- STOP HAVING SIDE CONVERSATIONS
- PARTICIPATE IN CLASS

Class 5
Review: Basic Labor Market with immigration; Labor Demand: Structural versus reduced form parameters
Borjas 1995 & more

- **Read for Wednesday's Class (Class 6)**
- **If you have not already looked at these please look at these again**
- **2.2 - Effect of Immigration on Wages**
- **3.1 – Why are there so many jobs?**

Problem Set 1 Posted

Solutions

$$w_0 = \frac{AD + BC}{B + D}$$

$$w = A - Bh^d \ldots(1)$$

$$w = C + Dh^s \ldots(2)$$

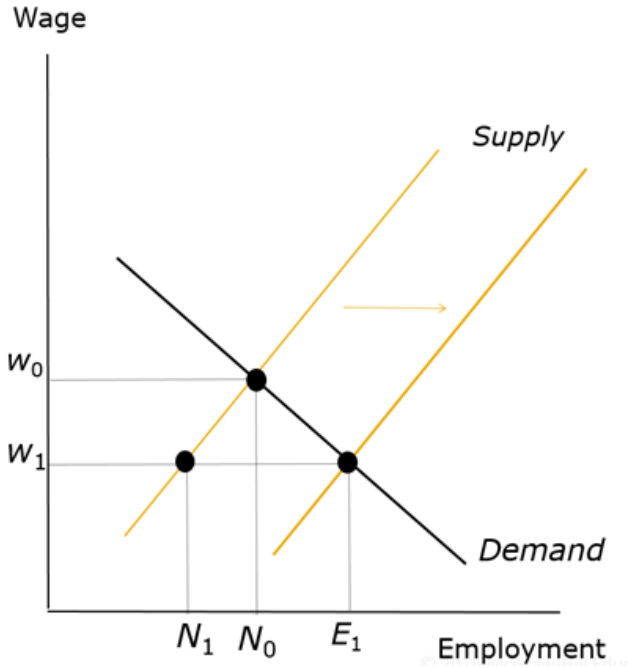
$$w = C - K + Dh^s \ldots(3)$$

$$w_1 = \frac{AD + B(C-K)}{B+D} = \frac{AD+BC}{B+D} - \frac{BK}{B+D} = w_0 - \frac{BK}{B+D}$$

$$If \;\; B = 0 \;\; then \;\; w_1 = w_0$$

$$N_0 = \frac{A-C}{B+D}$$

$$E_1 = \frac{A-(C-K)}{B+D} = \frac{A-C}{B+D} + \frac{K}{B+D} = N_0 + \frac{K}{B+D}$$



$$\frac{AD + B(C-K)}{B+D} = C + DN_1$$

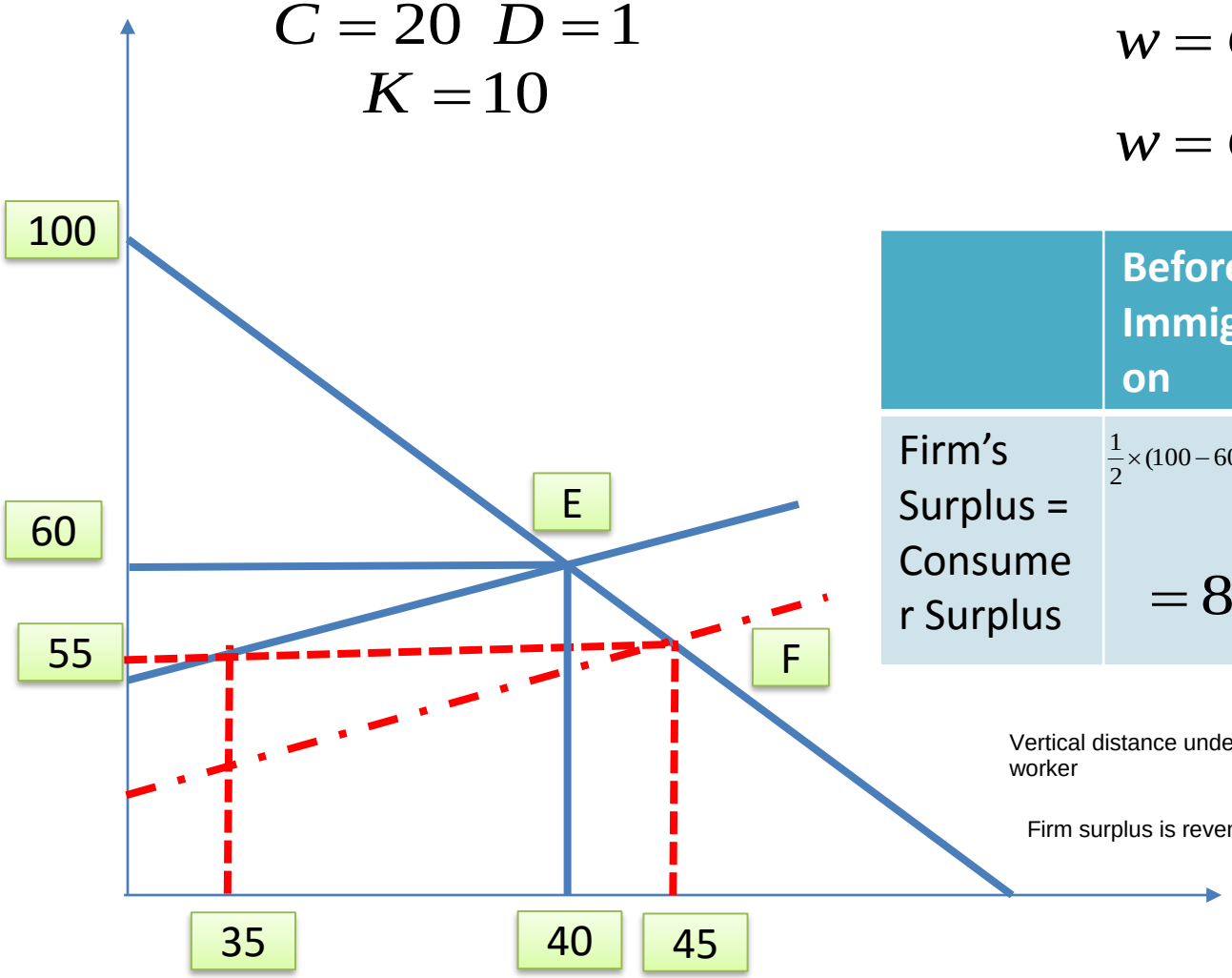
$$N_0 - \frac{BK}{D(B+D)} = N_1$$

$$If \;\; B = 0 \;\; then \;\; N_1 = N_0$$

$$A = 100 \quad B = 1$$
$$C = 20 \quad D = 1$$
$$K = 10$$

Solutions

$$w = A - Bh^d \ldots(1)$$
$$w = C + Dh^s \ldots(2)$$
$$w = C - K + Dh^s \ldots(3)$$



	Before Immigration	After Immigration	Change= After - Before
Firm's Surplus = Consumer Surplus	$\frac{1}{2}\times(100-60)\times(40)$ $= 800$	$\frac{1}{2}\times(100-55)\times(45)$ $= 1012.5$	$= 212.5$

Vertical distance under the demand curve is the marginal product of that worker

Firm surplus is revenue minus costs (profit)

Calculation of Firm Surplus: Consumer Surplus (B/C firms are the consumers of labor): All the area under demand curve to the equilibrium wage

Do immigrants steal jobs? Do immigrants work for lower wages?

Your answer?

$$q = f(E,K) \quad \frac{\partial f(E,K)}{\partial E} = MP_E \quad \frac{\partial f(E,K)}{\partial K} = MP_K$$

$$\Gamma = pf(E,K) + \lambda[TC - wE - rK]$$

$$\frac{\partial \Gamma}{\partial E} = 0 \Rightarrow p\frac{\partial f(E,K)}{\partial E} - \lambda w = 0....(1) \rightarrow pMP_E = \lambda w$$

$$\frac{\partial \Gamma}{\partial K} = 0 \Rightarrow p\frac{\partial f(E,K)}{\partial K} - \lambda r = 0....(2) \rightarrow pMP_K = \lambda r \quad .....(4)$$

$$\rightarrow \frac{MP_E}{MP_K} = \frac{w}{r}$$

$$\frac{\partial \Gamma}{\partial \lambda} = 0 \Rightarrow TC - wE - rK = 0.....(3)$$

Assume **Interior solution &** Assuming that the second order conditions hold

Use 1,2 and 3 OR 3 and 4 to find equilibrium values of E, K and Lambda

E* will give Demand for Labor Function

Demand for labor is obtained by equating **p*MPE to wage**

$$E^* = E(w; TC, r, techno\log y \;\; parameters).....(5)$$

$$q^* = f(E^*, K^*)...(6)$$

$$q = E^{\alpha}K^{\beta} \quad \frac{\partial f(E,K)}{\partial E} = \alpha E^{\alpha-1}K^{\beta} = MP_E \quad \frac{\partial f(E,K)}{\partial K} = \beta E^{\alpha}K^{\beta-1} = MP_K$$

$$\Gamma = pE^{\alpha}K^{\beta} + \lambda[TC - wE - rK]$$

$$\left.\begin{aligned} \frac{\partial \Gamma}{\partial E} &= p\alpha E^{\alpha-1}K^{\beta} - \lambda w = 0....(1) \rightarrow p\alpha E^{\alpha-1}K^{\beta} = \lambda w \\ \frac{\partial \Gamma}{\partial K} &= p\beta E^{\alpha}K^{\beta-1} - \lambda r = 0....(2) \rightarrow p\beta E^{\alpha}K^{\beta-1} = \lambda r \end{aligned}\right\} \rightarrow \frac{\alpha K^*}{\beta E^*} = \frac{w}{r} \quad .....(4)$$

$$\frac{\partial \Gamma}{\partial \lambda} = 0 \Rightarrow TC - wE^* - rK^* = 0.....(3)$$

E* will give Demand for Labor Function. Using 3 and 4

$$\left.\begin{aligned} TC &= wE^* + rK^* \\ K^* &= \frac{\beta w}{\alpha r}E^* \end{aligned}\right\} \rightarrow TC = wE^* + \frac{\beta}{\alpha r}wE^*$$

$$\rightarrow E^* = \frac{TC}{w\left(1 + \frac{\beta}{\alpha r}\right)} \qquad \rightarrow \left|\eta^D E^*\right| = \left|\frac{w}{E^*}\frac{\partial E^*}{\partial w}\right| = 1$$

Structural Parameters versus Reduced Form Parameters

$$E^* = \frac{TC}{w\left(1+\frac{\beta}{\alpha r}\right)}$$

$$\ln\left(E^*\right) = \ln\frac{TC}{\left(1+\frac{\beta}{\alpha r}\right)} - \ln(w)$$

$$\ln(w) = \ln\frac{TC}{\left(1+\frac{\beta}{\alpha r}\right)} - \ln\left(E^*\right)$$

$$wage = A - Bh^d$$

Shift Parameters: Makes demand curve shift

Compare the marginal product of labor for the two production functions: Cobb-Douglas versus Log Linear

What is the main difference? What does it mean?

Borjas

Immigration Surplus: “Let the right one in”

Questions & Answers

Q) What are the costs of immigration?

A) There are costs: usage of public goods (including security); usage of welfare system etc.

Q) Are there benefits from immigration?

A) Yes

Q) Where do the benefits come from?

A) Labor Market

Q) How big are these benefits?

A) Between 7 Bill to 25 Bill; can go up to 35 Bill

Q) Who gets the benefits?

A) The people who own capital

Q) Would these benefits justify the costs of immigration?

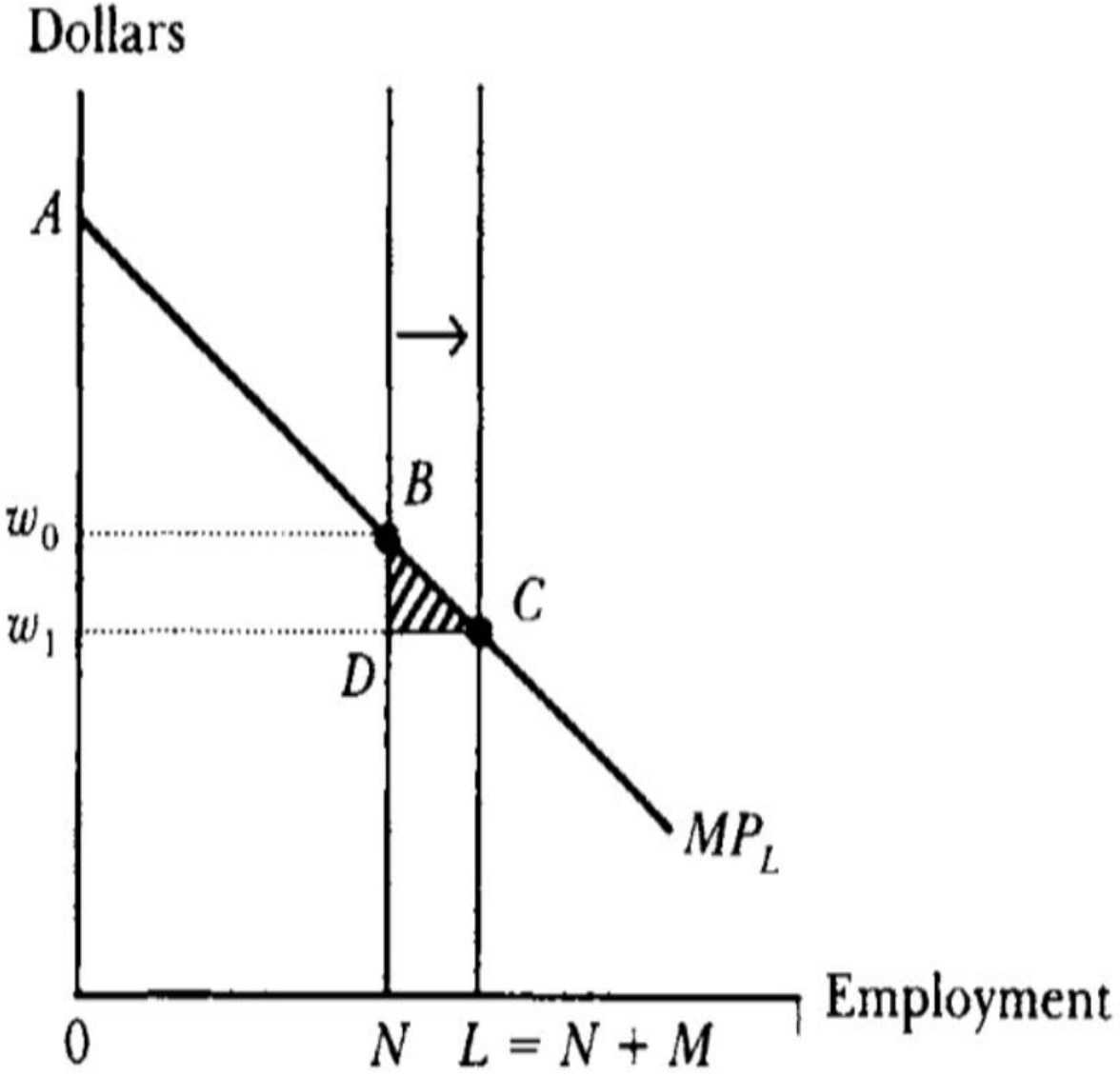
A) Possibly Not

Assumptions of the basic model

- **The production technology: Labor and Capital : Perfect Substitutes**
- No skill differences between natives
- CRS production function (worker and firm surplus goes to the respective players)
- Competitive input markets: wage = marginal product of labor; rent =marginal product of capital
- **Natives own capital:** have shares in the companies: avoids the problem of benefits going to immigrants
- Labor Supply is vertical {SE = IE}

Figure 1

The Immigration Surplus



$$\text{Immigration Surplus to Natives} = -\frac{1}{2} sem^2 \times Q$$

- s: labor's share in national income = wL/Q
- e: % change in wage from 1% change in labor force: **%change in w/% change in L – harmful effect**
- M: share of immigrants in the total population = M/L
- GDP =Q = 7 trillion

$$s = .7; e = -.3; m = .1$$

$$\text{Immigration Surplus} = 7.35 \text{ Billion}$$

$$s = .7; e = -1; m = .1$$

$$\text{Immigration Surplus} \approx 25 \text{ Billion}$$

With horizontal demand curve, all gains go to immigrants i.e. firm surplus =0

If wages in the new equilibrium **do not drop** , natives **do NOT get any benefit** from immigration

With vertical demand curve, all gains go to natives

The Borjas Story

- Suppose country is made of firms like Walmart
- Natives work for Walmart
- They hold stocks of Walmart – capital owners
- Immigrants come in
- Makes wage decrease
- Some natives quit as wages fall
- Everyone who remains are employed at lower wage
- Holder of capital earn more: stock prices increase as profit increases b/c of the wage drop

Redistribution of wealth: wages decrease because of immigration: wealth goes from labor to capital owners

This is why a lot of grumbling happens from native workers: not all of them hold capital in real life

Assumptions Relaxed

- Immigrants augment capital stock of a country: Investor Green Card: My experience with this
- **No External Effect:** having more immigrants does not create new knowledge & hence enhances productivity:

If it does, then immigration surplus will increase for natives to around 55Bill

- Immigrant Skills: Higher skills get higher surplus: difference between models with and without capital

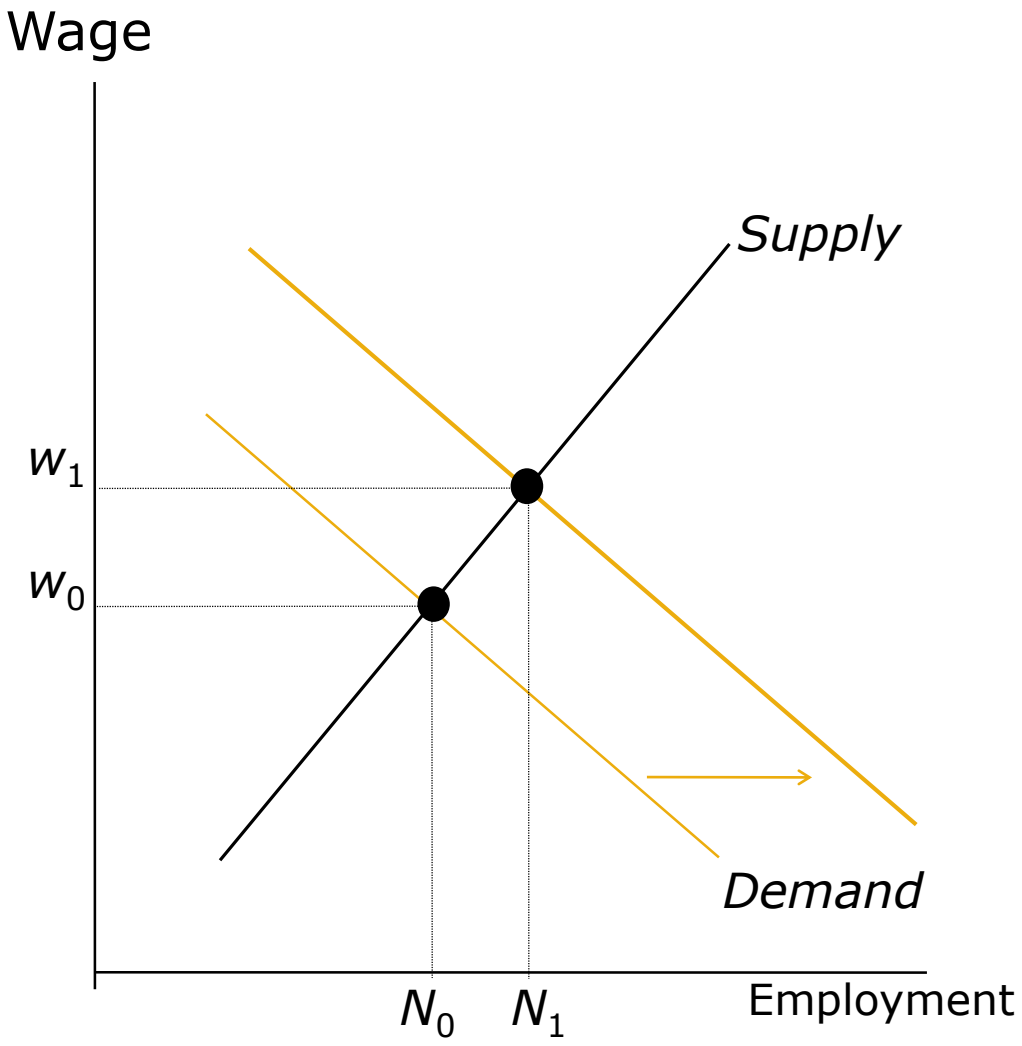
Main Theoretical Intuition: How different are the immigrants from the natives?

Main Empirical Intuition: Basis for Borjas 2003 & a lot of work in this area: Obtaining the structural Parameter: namely: the elasticity of substitution between immigrants and non immigrants

Pros and Cons of Borjas 1995

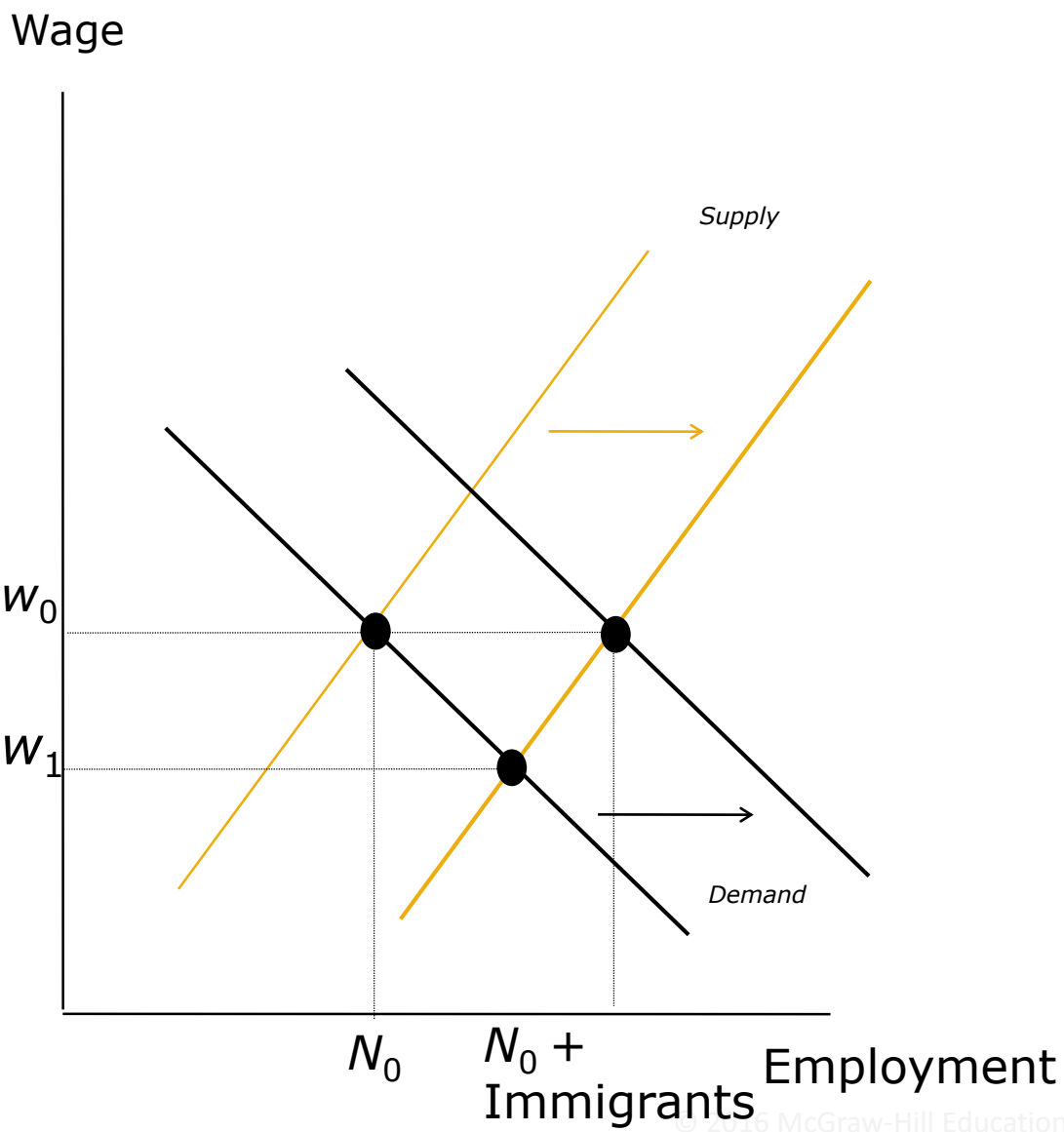
- Benefits of immigration – where they come from? How big are they? Who gets them?
- Wage reduction from immigration may not be harmful because it creates immigration surplus that natives get
- Immigration gains from **product market** through prices of goods and consumer surplus are not considered
- **External effects** in modern day (think of STEM and tech sector) can be really big making immigration surplus go way up for natives
- Impact on immigration to US from foreign countries can help American products abroad

The Short-Run Impact of Immigration when Immigrants and Natives are Complements



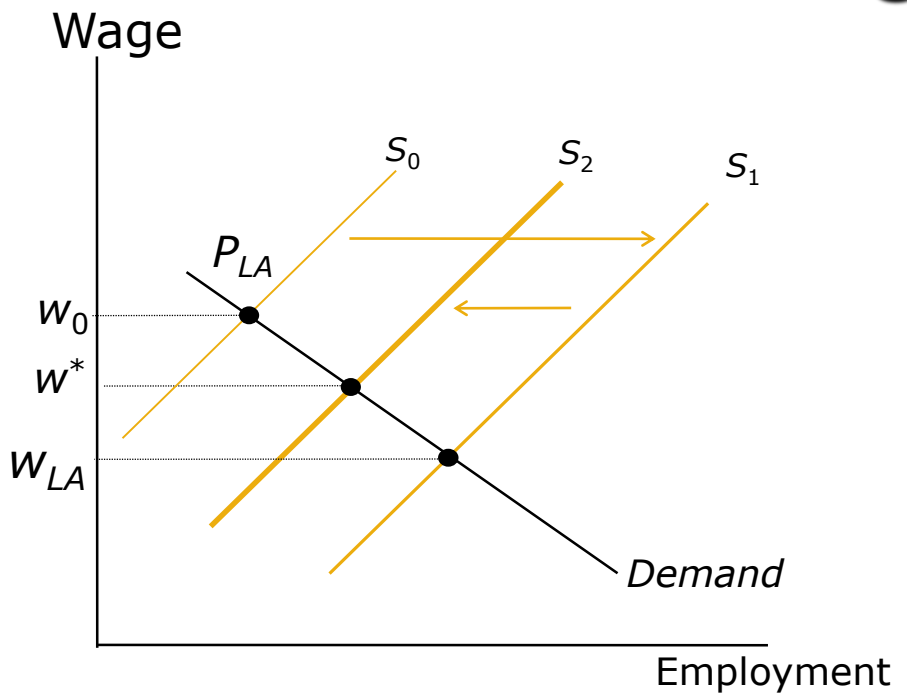
If immigrants and natives are complements, they do not compete in the same labor market. The labor market here denotes the supply and demand for native workers. Immigration makes natives more productive, shifting out the labor demand curve. This leads to a higher native wage and to an increase in native employment.

The Long-Run Impact of Immigration When Immigrants and Natives Are Perfect Substitutes

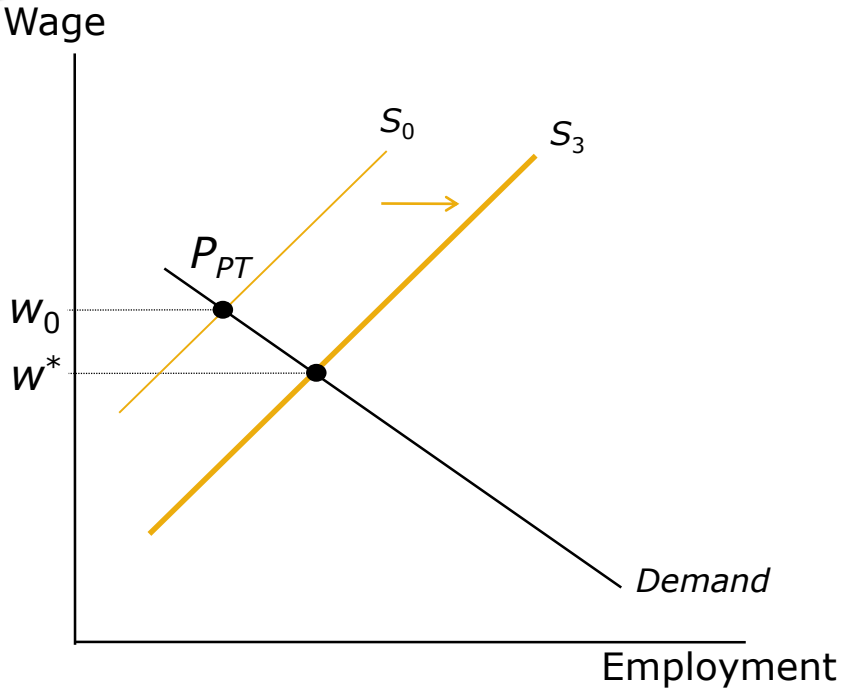


Immigration initially shifts out the labor supply curve so the wage falls from w_0 to w_1. Over time, capital expands as firms take advantage of the cheaper workforce, shifting out the labor demand curve and restoring the original wage and level of native employment.

The Native Labor Market's Response to Immigration



(*a*) Los Angeles



(*b*) Pittsburgh

Originally, both markets pay equilibrium wages of w_0. After immigration into Los Angeles, both markets eventually converge to a new equilibrium wage at w^*, which is less than w_0.