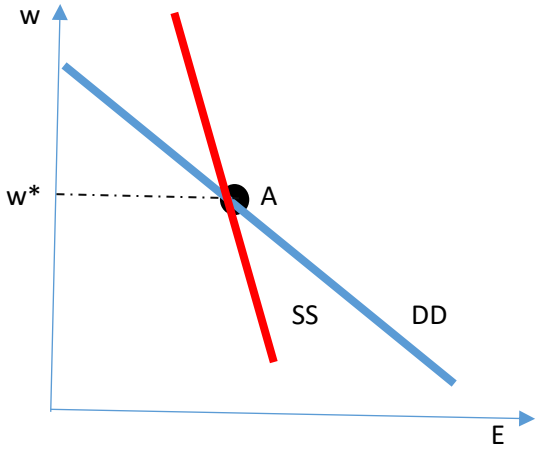
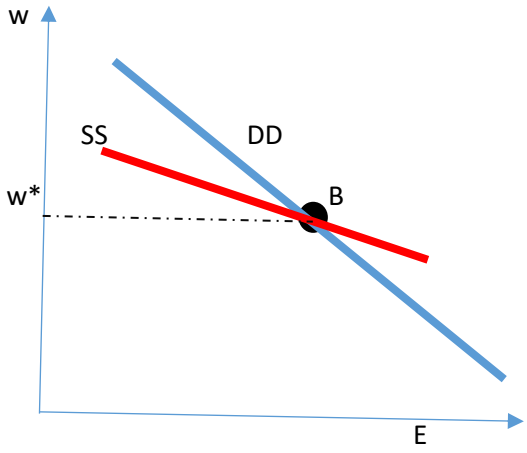
MT 1 Exams

Answers Question 1

a.



Panel 1



Panel 2

In Panel 1: Supply steeper than demand

In Panel 2: Demand Steeper than Supply

Panel 1: **Stable Equilibrium**: w>w* excess supply

Panel 2: **Unstable Equilibrium**: w>w* excess demand

b.

$$\alpha - \beta E^* = \psi + \delta E^*$$

$$\alpha - \psi = (\delta + \beta)E^*$$

$$E^* = \frac{\alpha - \psi}{(\delta + \beta)}$$

$$w^* = \psi + \delta\left(\frac{\alpha - \psi}{(\delta + \beta)}\right) = \left(\frac{\psi\delta + \psi\beta + \delta\alpha - \delta\psi}{(\delta + \beta)}\right) = \left(\frac{\psi\beta + \delta\alpha}{(\delta + \beta)}\right)$$

c.

$$E^* = \frac{\alpha - \psi}{(\delta + \beta)}$$

$$\ln(E^*) = \ln(\alpha - \psi) - \ln(\delta + \beta)$$

$$\frac{\partial E^*}{\partial \delta} = -\frac{E^*}{(\delta + \beta)} < 0 \ \ if \ \ \alpha > \psi$$

$$w^* = \left(\frac{\psi\beta + \delta\alpha}{(\delta + \beta)}\right)$$
$$\ln(w^*) = \ln(\psi\beta + \delta\alpha) - \ln(\delta + \beta)$$
$$\frac{\partial w^*}{\partial \delta} = \frac{\alpha}{\psi\beta + \delta\alpha} - \frac{1}{\delta + \beta} = \frac{\beta(\alpha - \psi)}{(\psi\beta + \delta\alpha)(\delta + \beta)} > 0$$

The changes you make in the demand for labor equation should show a decrease in demand curve (b/c generally with higher tax demand of a product decreases)

Situation 1: $w = \alpha - (\beta + \tau)E^d$

Situation 2: tax as lumpsum: $w = (\alpha - \tau) - \beta E^d$

d. Situation 1

$$\alpha - (\beta + \tau)E^* = \psi + \delta E^*$$
$$\alpha - \psi = (\delta + \beta + \tau)E^*$$
$$E^* = \frac{\alpha - \psi}{(\delta + \beta + \tau)}$$
$$w^* = \psi + \delta\left(\frac{\alpha - \psi}{(\delta + \beta + \tau)}\right) = \left(\frac{\psi\delta + \psi\beta + \delta\alpha - \delta\psi + \tau\psi}{(\delta + \beta + \tau)}\right) = \left(\frac{\psi\beta + \delta\alpha + \tau\psi}{(\delta + \beta + \tau)}\right)$$

$$E^* = \frac{\alpha - \psi}{(\delta + \beta + \tau)}$$
$$\ln(E^*) = \ln(\alpha - \psi) - \ln(\delta + \beta + \tau)$$
$$\frac{\partial E^*}{\partial \tau} = -\frac{E^*}{(\delta + \beta + \tau)} < 0 \ \ if \ \ \alpha > \psi$$

$$w^* = \left(\frac{\psi\beta + \delta\alpha + \tau\psi}{(\delta + \beta + \tau)}\right)$$
$$\ln(w^*) = \ln(\psi\beta + \delta\alpha + \tau\psi) - \ln(\delta + \beta + \tau)$$
$$\frac{\partial w^*}{\partial t} = w^* \times \left(\frac{\psi}{\psi\beta + \delta\alpha + \tau\psi} - \frac{1}{\delta + \beta + \tau}\right) = w^* \times \left(\frac{\delta(\psi - \alpha)}{(\psi\beta + \delta\alpha + \tau\psi)(\delta + \beta + \tau)}\right) < 0$$

Situation 2

$$(\alpha - \tau) - \beta E^* = \psi + \delta E^*$$

$$\alpha - \tau - \psi = (\delta + \beta) E^*$$

$$E^* = \frac{\alpha - \tau - \psi}{(\delta + \beta)}$$

$$w^* = \psi + \delta\left(\frac{\alpha - \tau - \psi}{(\delta + \beta)}\right) = \left(\frac{\psi\delta + \psi\beta + \delta\alpha - \tau\delta - \delta\psi}{(\delta + \beta)}\right) = \left(\frac{\psi\beta + \delta\alpha - \tau\delta}{(\delta + \beta)}\right)$$

$$E^* = \frac{\alpha - \tau - \psi}{(\delta + \beta)}$$

$$\ln(E^*) = \ln(\alpha - \tau - \psi) - \ln(\delta + \beta)$$

$$\frac{\partial E^*}{\partial \tau} = -\frac{E^*}{(\alpha - \tau - \psi)} < 0 \ \ if \ \ \alpha - \psi > \tau$$

$$w^* = \left(\frac{\psi\beta + \delta\alpha - \tau\delta}{(\delta + \beta)}\right)$$

$$\ln(w^*) = \ln(\psi\beta + \delta\alpha - \tau\delta) - \ln(\delta + \beta)$$

$$\frac{\partial w^*}{\partial t} = -\frac{w^* \times \delta}{\psi\beta + \delta\alpha - \tau\delta} < 0$$

Answers Question 2

a.

$$q^{new} = (mE)^{\alpha} + A(mK) = m^{\alpha}E^{\alpha} + mAK = m\left(m^{\alpha-1}E^{\alpha} + AK\right)$$

if $\alpha = 1$ then

$$q^{new} = m\left(m^{1-1}E^{\alpha} + AK\right) = mq^{old}$$ we get CRS

b.

$$q = E^{\alpha} + AK \rightarrow MP_E = \alpha E^{\alpha-1} \rightarrow MP_K = A$$

$$\Gamma = pq + \lambda[TC - wE - rK]$$

$$\left.\begin{array}{l} \frac{\partial \Gamma}{\partial E} = 0 \rightarrow pMP_E = \lambda w \end{array}\right\} \rightarrow p\alpha E^{\alpha-1} = \lambda w$$

$$\left.\begin{array}{l} \frac{\partial \Gamma}{\partial K} = 0 \rightarrow pMP_K = \lambda r \end{array}\right\} \rightarrow pA = \lambda r$$

$$\frac{\partial \Gamma}{\partial \lambda} = 0 \rightarrow TC = wE^{*} + rK^{*}$$

$$\rightarrow \frac{\alpha E^{\alpha-1}}{A} = \frac{w}{r} \rightarrow E^{*\alpha-1} = \frac{Aw}{\alpha r} \rightarrow E^{*} = \left(\frac{Aw}{\alpha r}\right)^{\frac{1}{\alpha-1}}$$

$$E^{*} = \left(\frac{Aw}{(\alpha r)}\right)^{\frac{1}{\alpha-1}} = (w)^{\frac{1}{\alpha-1}}\left(\frac{A}{(\alpha r)}\right)^{\frac{1}{\alpha-1}}$$: **LABOR DEMAND FUNCTION**

$$\ln E^{*} = \frac{1}{\alpha-1}\ln w + \frac{1}{\alpha-1}(\ln A - \ln \alpha - \ln r)$$

$$\ln E^{*} = \frac{1}{\alpha-1}\ln w + cons\tan t \rightarrow \left|\eta^{D}\right| = \frac{1}{\alpha-1} < 0 \ \ if \ \ \alpha < 1$$ **LABOR DEMAND ELASTICITY & condition for slope of demand curve to be negative**

c.

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

$$\frac{\partial E^*}{\partial A} = \frac{1}{\alpha - 1}\left(\frac{E^*}{A}\right) < 0 \ \ if \ \ \alpha < 1$$

$$\frac{\partial E^*}{\partial \alpha} = -\frac{1}{\alpha - 1}\left(\frac{E^*}{\alpha}\right) > 0 \ \ if \ \ \alpha < 1$$

$$\frac{\partial E^*}{\partial p} = 0$$

d.

$$E^* = \left(\frac{Aw}{\alpha r}\right)^{\frac{1}{\alpha - 1}}$$

$$TC = wE^* + rK^* \rightarrow K^* = \frac{TC}{r} - \frac{w}{r}E^* \rightarrow K^* = \frac{TC}{r} - \frac{w}{r}\left(\frac{Aw}{\alpha r}\right)^{\frac{1}{\alpha - 1}}$$

$$q^* = A\left[\frac{Aw}{\alpha r}\right]^{\frac{1}{\alpha - 1}}\left[\frac{TC}{r} - \frac{w}{r}\left(\frac{Aw}{\alpha r}\right)^{\frac{1}{\alpha - 1}}\right]$$

Answer 3

a. Main dependent variable: Growth in wages and employment; Main dependent variable: Hurricanes affecting a country OR the neighboring county
b. The identification strategy is randomly separating counties as treatment and control. The exogenous variation is provided by the unpredictability of the path of the hurricanes. The county that is hit serves as a randomly assignment treatment and the county that is spared acts as a randomly assigned control group.
c. Believable b/c: the changes in wages and employment follow the analysis of the basic labor market AND more severe hurricanes reinforce these results (wage increase in counties that are hit relative to counties that are spared). Unbelievable b/c: The preparation of counties is a function of governance – may be counties that get hit and suffer have poor governance and would have suffered irrespective of hurricanes
d. It shows that the labor markets that we use to analyze the effect of policy are believable. It gives confidence to students, professors and researchers that they are not chasing shadows.

Answer 4

a. The idea is that the natives are similar to the immigrants. So, with more immigrants, there is a fall in wage. Some natives quit because the wages are too low for them. However, the fall in wages increases profits. Because natives own capital (through stock market) they get the benefit of the wage drop through higher capital gains.
b. Underestimated because the immigration surplus in Borjas comes ONLY from the labor market through a reduction in wage, increase in profits and a redistribution of wealth to capital owners. Some economists have argued that this is hardly how it works. They point out to the product market benefits + human capital externality benefits of immigration. In short, the elasticity of aggregate output improving b/c of immigration can be very high (Borjas actually does not agree with this, but most recent research disagrees)
c. Menial jobs which are routine based will go away because of automation. However, jobs where abstract thinking and manual labor with communication skills are required will not be substituted away. The future of professors depend on whether their jobs are routine (i.e. selecting exams from a test bank) or abstract (introducing students to multiple perspectives & stimulate their intellect). Chances are professors will not be easily substituted away by machines. However, TAs will possibly have a harder time (most of their work involves grading, which will be done by machines)
d. This paper ignores the problem of higher competition because of lower distribution costs through mechanization. People's hunger for news have increased, but the medium has changed from newspapers to social media. Everyone can become a journalist/photographer today. This has seriously increased supply of this group driving down price of the product.

Answers Question 5

Endogenous variables: E and J

Exogenous Variables: $\overline{B}; p; \overline{K}; \alpha; A; w_E; w_J; r$

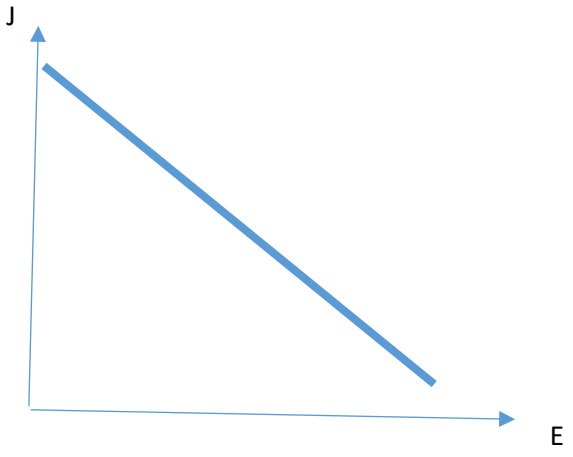
$$\underset{\{E,J\}}{Max} \left(E+J\right)^{\alpha}(A\overline{K})$$

s.t. $\overline{B} + p^4 = w_E E + w_J J + r\overline{K}$

$$q = \left(E+J\right)^{\alpha}(A\overline{K}) \rightarrow MP_E = \alpha\left(E+J\right)^{\alpha-1}(A\overline{K}) \rightarrow MP_J = \alpha\left(E+J\right)^{\alpha-1}(A\overline{K})$$

$$MRTS = -\frac{MP_E}{MP_J} = 1$$

Straight line Isoquants



You should not impose a min wage: this is because professors and engineers are substitutes in the production function. The cheaper guy gets hired.