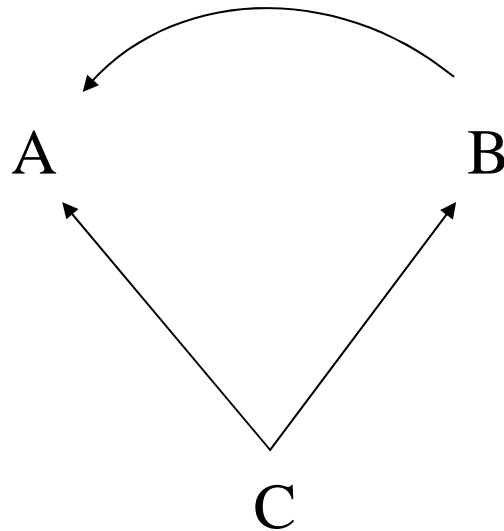


## Dale-Krueger



B = The average SAT score of the college you attend.

A = Your labor market outcome (salary) 20 years later.

C = An index of your characteristics that are observed by college admission committees but not the researcher. More C increases the **maximum** SAT score of the set of schools that accept you. This creates a correlation between C and B. Larger C is correlated with higher salaries by assumption.

If the true effect of B on A is positive, then this effect is overstated if you cannot measure C.

Dale-Krueger argue they have a good indicator of C, the pattern of acceptances and rejections from schools to which you applied. That is to say, any two people with the same pattern of acceptances and rejections are identical in C. If true, they can control for C by defining indicator variables, one for each group of individuals with the same pattern of acceptances and rejections. They then identify the effect of B on A through the variation in B that exists among individuals who belong to the same group.

There is at least one big reason to doubt that all individuals in the same group are really identical in C. These people probably receive different financial aid offers. This means there is something in C, say C', that is observed by college admission committees but not the researcher and which is **not** measured by the pattern of acceptances and rejections. Furthermore, it could well be that C' is positively correlated with A but negatively correlated with B. This would happen if the less selective of the schools to which you are admitted offer more financial aid.

If the true effect of B on A is positive, then this effect is understated if you cannot measure C'. In any group of individuals with the same pattern of acceptances and rejections, there would be a systematic (non-random) choice of relatively less selective schools.

Actual distributions of welfare ("equilibrium")  
 vs. feasible distributions of welfare.



Distributions of utility.  
 An **economy** is the bare minimum structure needed to describe the feasible distributions of utility in a society.  
 Technical structure behind the economy:

$U^1(x_1, y_1)$  Two people preferences  
 $U^2(x_2, y_2)$  over two goods.

$g(L_x, K_x)$ : technology for X good.

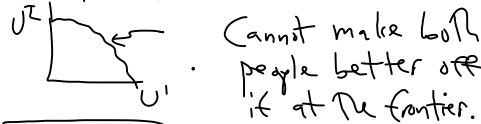
$\left\{ \begin{array}{l} L_x = \text{labor used to produce } X \\ K_x = \text{capital used to produce } X \end{array} \right.$ 
 "X industry"

$f(L_y, K_y)$ : technology for Y industry

$\bar{L}, \bar{K}$ : total  
resource constraints.

That's it. No prices,  
no budget constraints, no markets,  
no behavior (profit max,  $U_{max}$ ).

We are especially interested  
in the frontier of



### Vocabulary

An allocation:

$$(X_1, Y_1, X_2, Y_2, L_x, K_x, L_y, K_y)$$

A list of goods going to each  
person and inputs going to  
each industry.

A feasible allocation is  
an allocation that

Satisfies:

$$1) X_1 + X_2 \leq g(L_x, K_x)$$

consumed  $\leq$  produced

$$2) Y_1 + Y_2 \leq f(L_y, K_y)$$

$$3) L_x + L_y \leq \bar{L}$$

$$4) K_x + K_y \leq \bar{K}$$

Handwritten blue text at the top of the page, partially cut off.

POSTAL OFF.

CAN WORK SCHEDULE

with all the

## Production efficiency

(All efficient allocations will satisfy production efficiency.)

An allocation satisfies P.E. if it is feasible and it is not possible to produce more of both outputs.

Assuming nice functions, if we have a production efficient allocation, say

$$(x_1^*, y_1^*, x_2^*, y_2^*, L_x^*, K_x^*, L_y^*, K_y^*)$$

$$f(L_y^*, K_y^*) = \underset{\substack{L_y, K_y \\ L_x, K_x}}{\text{Max}} f(L_x, K_x)$$

Subject to the constraints:

$$g(L_x, K_x) = g(L_x^*, K_x^*)$$

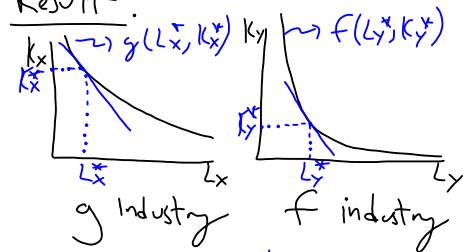
A number

$$L_x + L_y = \bar{L}$$

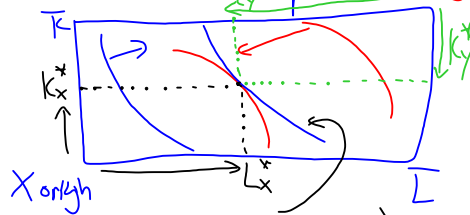
$$K_x + K_y = \bar{K}$$

This we can work with!  
Write down Lagrangean,  
etc.

Result:



Same slopes. Y origin



$$g(L_x, k_x) = g(L_x^*, k_x^*)$$

$$\Rightarrow k_x^*(L_x), \text{ Isoquant}$$

$$g[L_x, k_x^*(L_x)] = g(L_x^*, k_x^*)$$

$$\Rightarrow \frac{\partial g}{\partial L_x} + \frac{\partial g}{\partial k_x^*} \cdot \frac{\partial k_x^*}{\partial L_x} = 0$$

$$\Rightarrow \frac{\partial k_x^*}{\partial L_x} = - \frac{\partial g / \partial L_x}{\partial g / \partial k_x^*}$$

$$\rightarrow \text{MRTS}_{LK}^X = - \frac{MP_L^X}{MP_K^X}$$

(slope of isoquant)

What we have shown is:

$$\text{MRTS}_{LK}^X = \text{MRTS}_{LK}^Y$$

$$\text{So } \frac{MP_L^X}{MP_K^X} = \frac{MP_L^Y}{MP_K^Y}$$