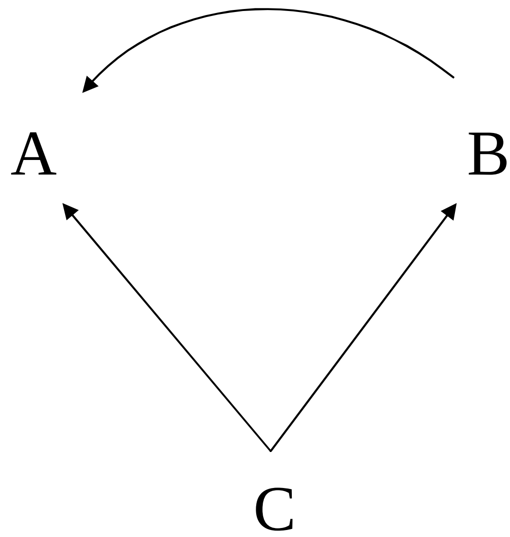
Dale-Krueger



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 toward relatively less selective schools by people whose C' characteristics will lead to high salaries. This "flattens" the observed relationship between B and A.

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:

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

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

notation for:
L_x = labor used to produce X.
K_x = capital used to produce X

$f(L_y, K_y)$: 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, Umax).

We are especially interested in the frontier of

Cannot make both people better off if at the frontier.

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

Efficient allocation:

A feasible allocation with the property that no other feasible allocation can make everyone better off.

<u>Efficient</u> <u>allocations</u> give the distributions of utility on the <u>frontier</u>, and vice-versa.

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

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

Subject to the constraints:

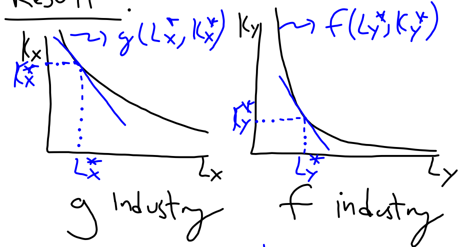
$$g(L_x, K_x) = \underbrace{g(L_x^*, K_x^*)}_{\text{A number}}$$

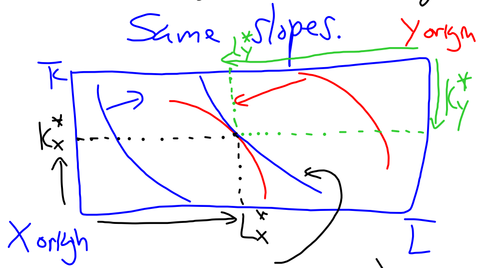
$$L_x + L_y = \bar{L}$$

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

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

Result:





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

$$\Rightarrow K_x^*(L_x), \text{ isoquant}$$

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

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

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

$$\Rightarrow \boxed{\underset{\text{(slope of isoquant)}}{MRTS_{LK}^x} = - \frac{MP_L^x}{MP_K^x}}$$

What we have shown is:

$$MRTS_{LK}^x = MRTS_{LK}^Y$$

$\boxed{\text{So}}$ $\boxed{\dfrac{MP_L^x}{MP_K^x} = \dfrac{MP_L^Y}{MP_K^Y}}$

Suppose $\boxed{MRTS^X_{LK} > MRTS^Y_{LK}}$

at some allocation.

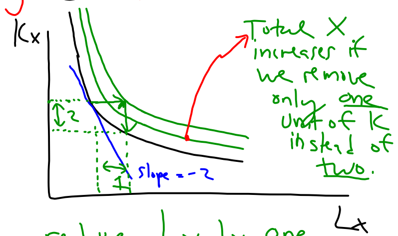
This means the necessary condition for production efficiency does <u>not</u> hold. So, it should be possible to increase the output of one good without decreasing the output of the other. This is what it means for

$$\boxed{MRTS^X_{LK} = MRTS^Y_{LK}}$$

to be a <u>necessary</u> condition for production efficieny.

<u>So</u>, how do we do this?

<u>Intuition</u>: We have $MRTS^X_{LK}$ is "too big" so MP^X_L is too big. This means more labor should be used in the production of good X, and less capital.



We can reduce L_Y by one unit and transfer it to production of good X, so $\uparrow L_X$ by 1. We can reduce K_X by one unit and transfer it to production of good Y. Total Y is unchanged, total X increases