PRE-LECTURE VIDEO
ISOCOST

Recall: Short-Run vs. Long-Run Input Choice

- Recall the input prices
  - price of labor is *w* per unit
  - price of capital is *r* per unit
- In the short run, capital is fixed
  - Solve for the cost-minimizing quantity of labor
- In the long run, both *L* and *K* are variable
  - Solve for the cost-minimizing quantity of both labor and capital

How to find out the optimal *L* and *K* in the long run?

- For any output level Q_0 Q is given, the firm wants to produce Q.
- Need to find out the quantity of *L* and *K* that *minimizes* the total cost of production similar to consumer choice
- We need some curve that represents output
  - Isoquant (similar to the indifference curve)
- We also need some curve that represents cost
  - Something similar to the budget line Isocost

Isocost

If I have an isocost, any point along the same isocost is equally expensive to the firm.

- An *isocost* connects all combinations of *L* and *K* that cost the firm the same amount of money
- The equation of isocost is

$$wL + rK = TC$$

- For example, suppose
  - *w*=10, *r*=20
- The isocost for a total cost of 5000 is

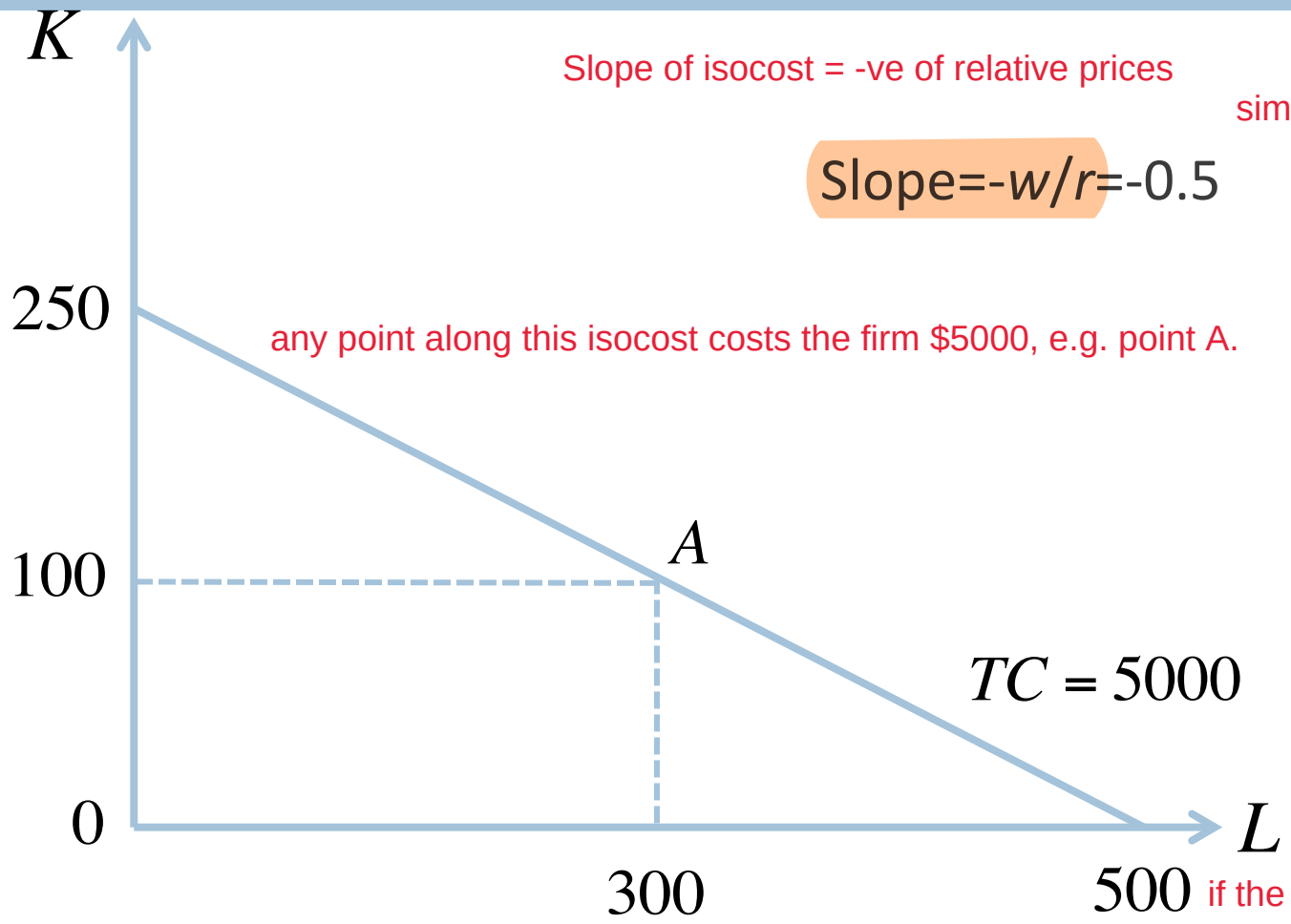
$$10L + 20K = 5000$$

straight line

Any choice of L and K which satisfy this equation will cost the firm $5000.

Isocost in Graph

There are infinitely many isocosts, given the same input prices. Just change TC then can draw another isocost.



Slope of isocost = -ve of relative prices

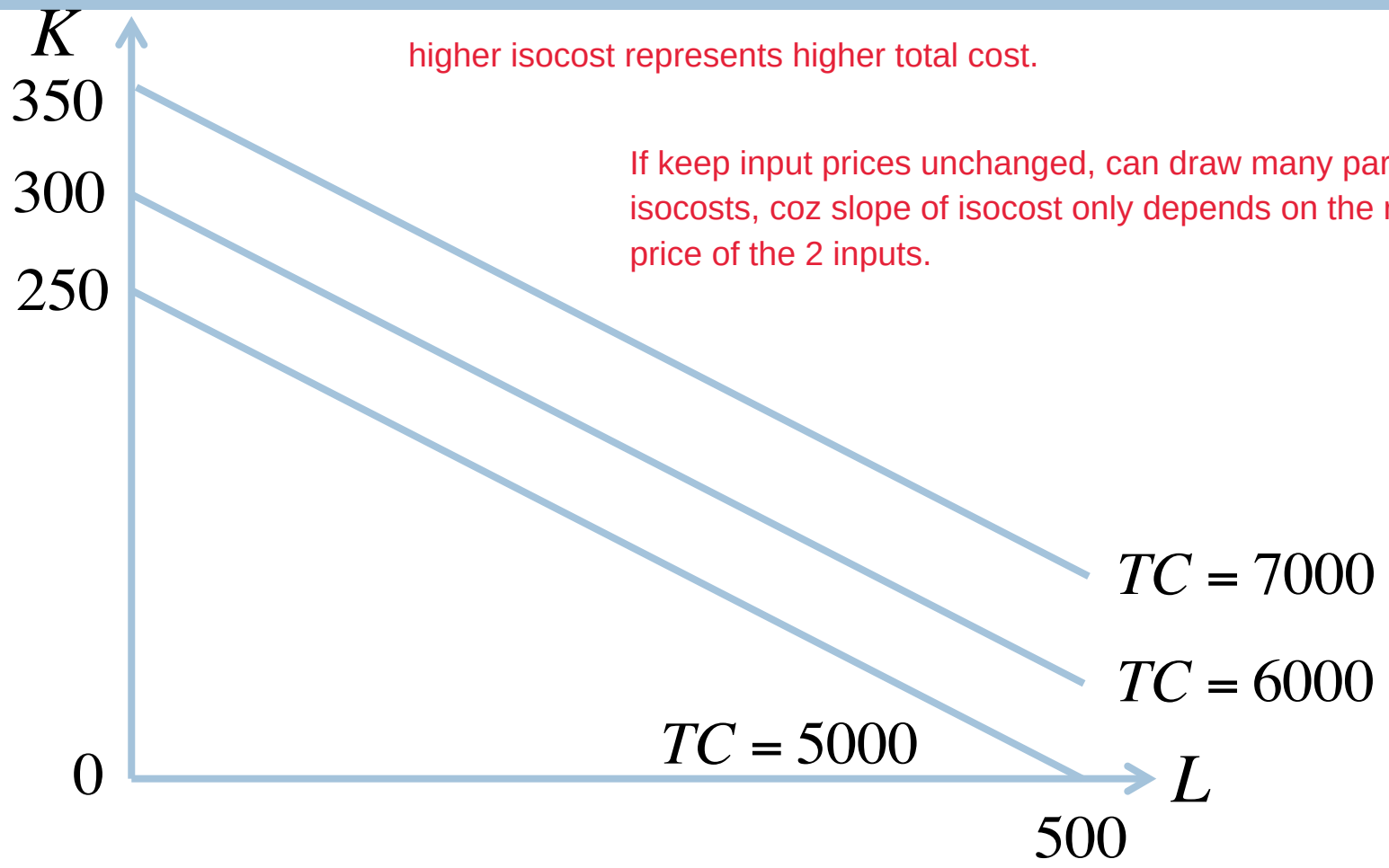
similar to budget line

Slope=-w/r=-0.5

any point along this isocost costs the firm $5000, e.g. point A.

if the firm wants to incur a total cost of $5000, by only using labor, the firm can use 500 units of labor.

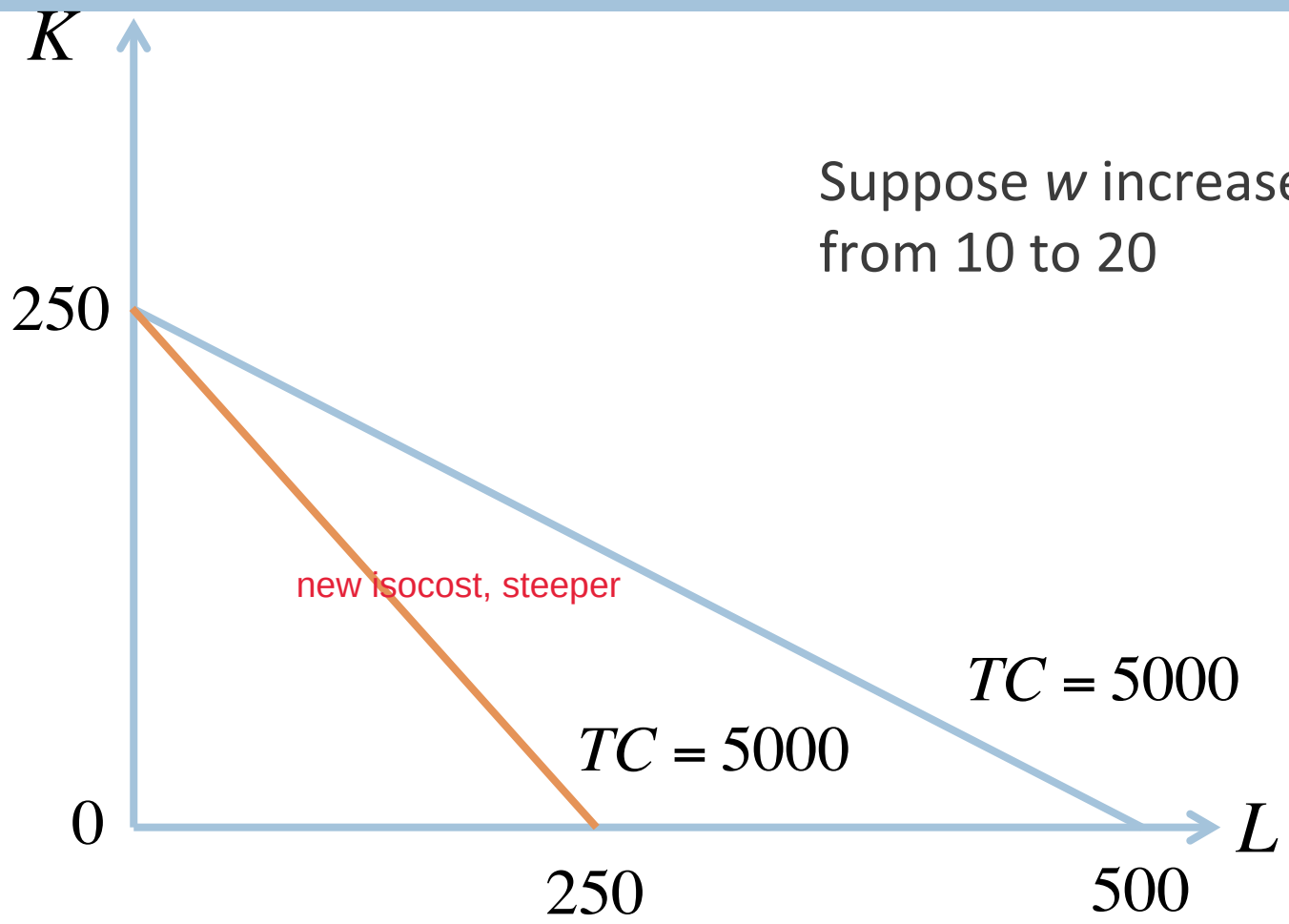
Higher Isocost, Higher Total Cost



higher isocost represents higher total cost.

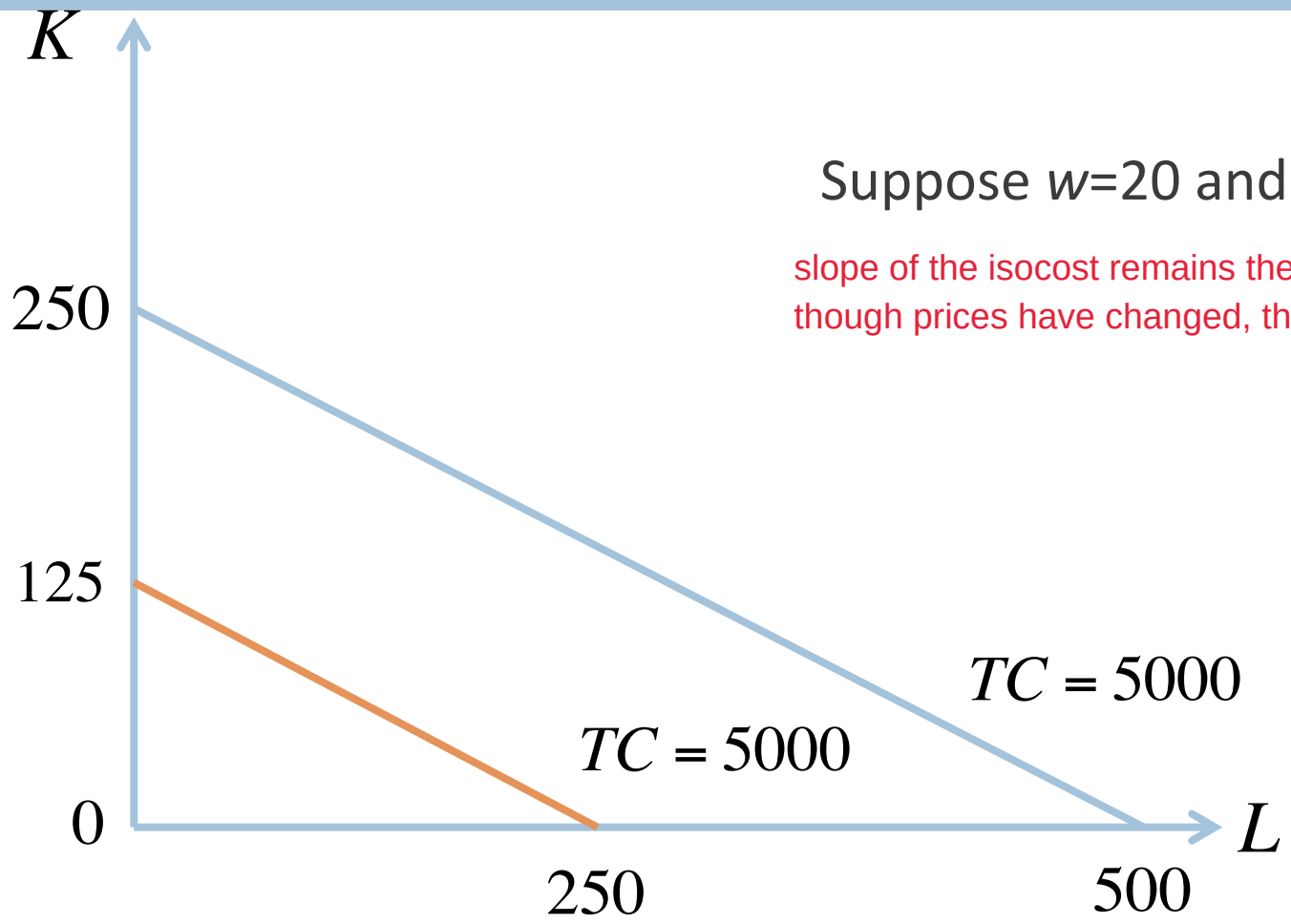
If keep input prices unchanged, can draw many parallel isocosts, coz slope of isocost only depends on the relative price of the 2 inputs.

What if labor becomes more expensive?



What if *w* and *r* increase by the same proportion?

slope of isocost will not change, but move to the origin.



Suppose *w*=20 and *r*=40

slope of the isocost remains the same. Coz even though prices have changed, the relative price has not.

Isoquant vs. Isocost

we are going to use both curves to identify the cost-minimizing choice of inputs for the firm in graph.

- If two points are on the same isoquant
  - They generate the same amount of output
- If two points are on the same isocost
  - They cost the firm the same amount of money
- Two points on the same isoquant are not necessarily on the same isocost
- Two points on the same isocost are not necessarily on the same isoquant