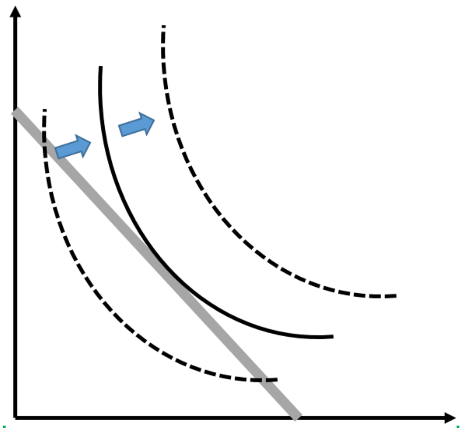
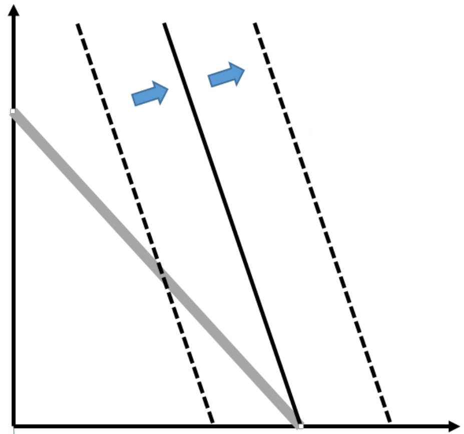
Econ 10A Cumulative Study Guide

Consumer Choice Problem: maximize utility subject to the budget constraint

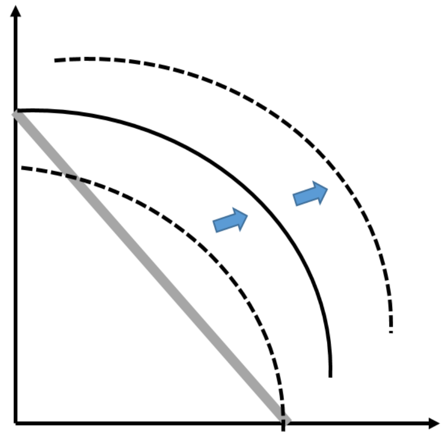
DMRS



CMRS



IMRS



Use Tangency Condition:

MRS = Price Ratio

Corner Solution: Plug the intercepts of B.C. into the utility function

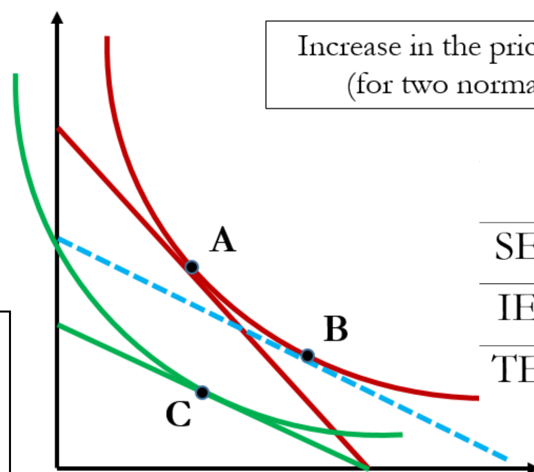
Substitution and Income Effects due to a price change

Substitution Effect (A→B): Due to a change in relative price (Hicks: hold utility constant) (graphically a change in slope)

Income Effect (B→C): Due to a change in purchasing power (hold new price constant) (graphically a parallel shift)

Total Effect (A→C): SE + IE

To find point B, set U(A)=U(B), then for:
DMRS: use the tangency condition & plug in
CMRS/IMRS: B is on same axis as C (either X_B or Y_B will be 0, same as point C)



Increase in the price of good Y
(for two normal goods)

	X	Y
SE	+	-
IE	-	-
TE	?	-

Elasticity

General formula "The B elasticity of A"
A: demand for a good, labor supply,…
B: income, price, wage,…

$$E_{A,B} = \frac{\%\Delta A}{\%\Delta B} = \frac{dA}{dB} \cdot \frac{B}{A}$$

Interpretation: A 1% increase in B causes a $E_{A,B}$% increase/decrease in A

Example: Let $x^* = \frac{m}{2p_x}$, find the income elasticity of demand.

$$E_{x^*,m} = \frac{dx^*}{dm} \cdot \frac{m}{x^*} = \frac{1}{2p_x} \cdot \frac{m}{\frac{m}{2p_x}} = +1$$

A 1% increase in income causes a 1% increase in demand

Cost Minimization: the producer side analog of Utility Maximization

Budget Constraint: $\boldsymbol{m = p_1x_1 + p_2x_2}$

Slope of Budget Constraint: $-\frac{p_1}{p_2}$

Utility Function: $\boldsymbol{U(x_1, x_2)} \rightarrow$ **Indifference Curves**

Slope of Indifference Curves: $\boldsymbol{MRS} = -\frac{MU_1}{MU_2}$

Goal: Maximize utility subject to budget constraint

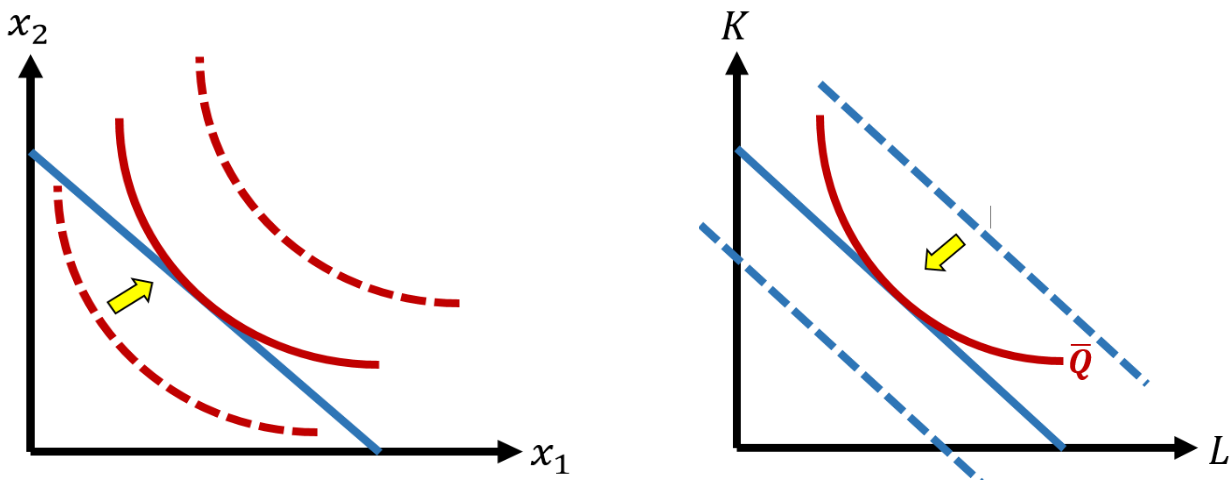
Cost Function: $\boldsymbol{TC = wL + rK} \rightarrow$ **Isocost Curves**

Slope of Isocost Curves: $-\frac{w}{r}$

Production Function: $\boldsymbol{Q = F(L, K)} \rightarrow$ **Isoquant**

Slope of Isoquant Curve: $\boldsymbol{TRS} = -\frac{MP_L}{MP_K}$

Goal: Minimize cost subject to output (Q)



Optimal bundle is at a tangency for DMRS and DTRS!

What's fixed/given determines which type of problem it is:

	Short Run	Long Run
Cost Min	$\bar{K}, \bar{Q}$	$\bar{Q}$
Profit Max	$\bar{K}$	

Notation:

	Short Run	Long Run
Cost Min	L_Q^{SR}	L_Q^{LR}
Profit Max	L^{SR}	L^{LR}

To solve **Cost Min Short Run**:

- Plug given K and Q into production function Q=F(L,K). Solve for L.

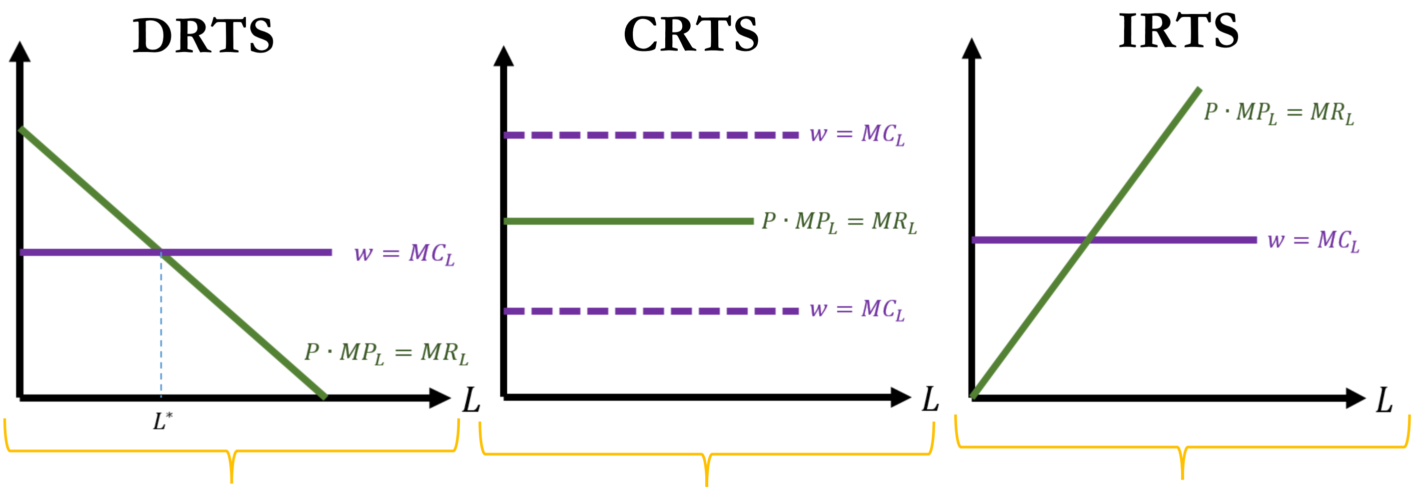
To solve **Cost Min Long Run**:

- Find the TRS of the production function.
- If DTRS, use tangency condition (TRS=w/r), solve for K, plug isolated K into production function, solve for L, use tangency condition to solve for K.
- If CTRS or ITRS then corner solution: all L or all K. Find intercepts of isoquant by plugging given Q into production function and setting L=0 then K=0. Optimal bundle is the cheapest intercept, so plug intercepts into TC function and compare cost.

Profit Maximization

Returns to Scale (RTS): How output changes when inputs change proportionally. To find returns to scale: double inputs and see if output exactly doubles (CRTS), less than doubles (DRTS) or more than doubles (IRTS).

(Note that everything below is in terms of L but can easily be replaced with K by switching w to r)



Second order condition satisfied, from first order condition we get:

$$\boldsymbol{P \cdot MP_L = w}$$

$$\boldsymbol{P \cdot MP_K = r}$$

Optimal will be 0 or as much as possible. Compare MR and MC.

If $\boldsymbol{P \cdot MP_L > w}$, choose L max

If $\boldsymbol{P \cdot MP_L < w}$, choose L = 0

Optimal will be 0 or as much as possible. Using max L, check π.

If $\pi > 0$, choose L max

If $\pi < 0$, choose L = 0

$$\pi = Total\ Revenue - Toal\ Cost = p \cdot F(L, K) - (wL + rK)$$