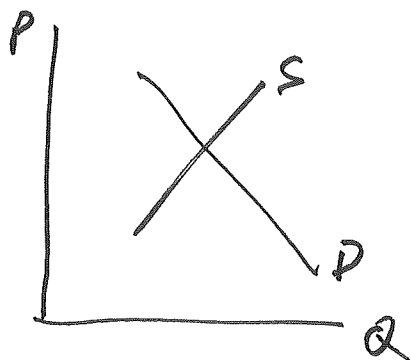


- Positive
- Normative

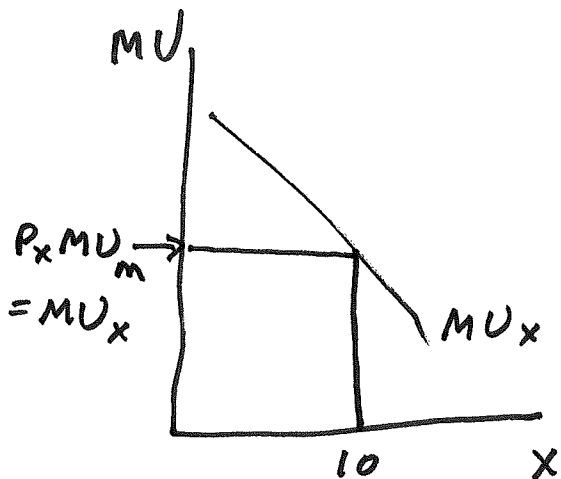


Invisible Hand Theorem.

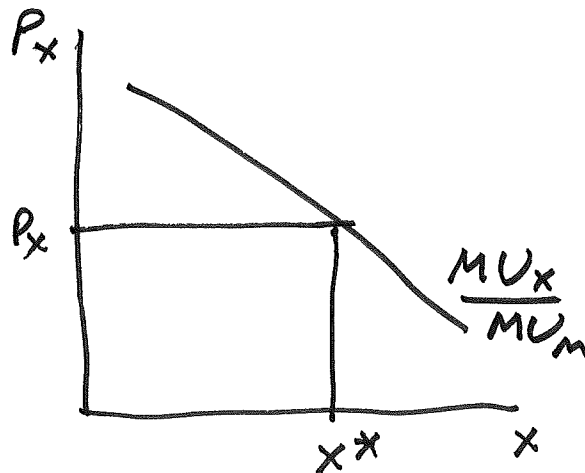
Theory of Demand

Marshall 1890

- Diminishing Marginal Utility



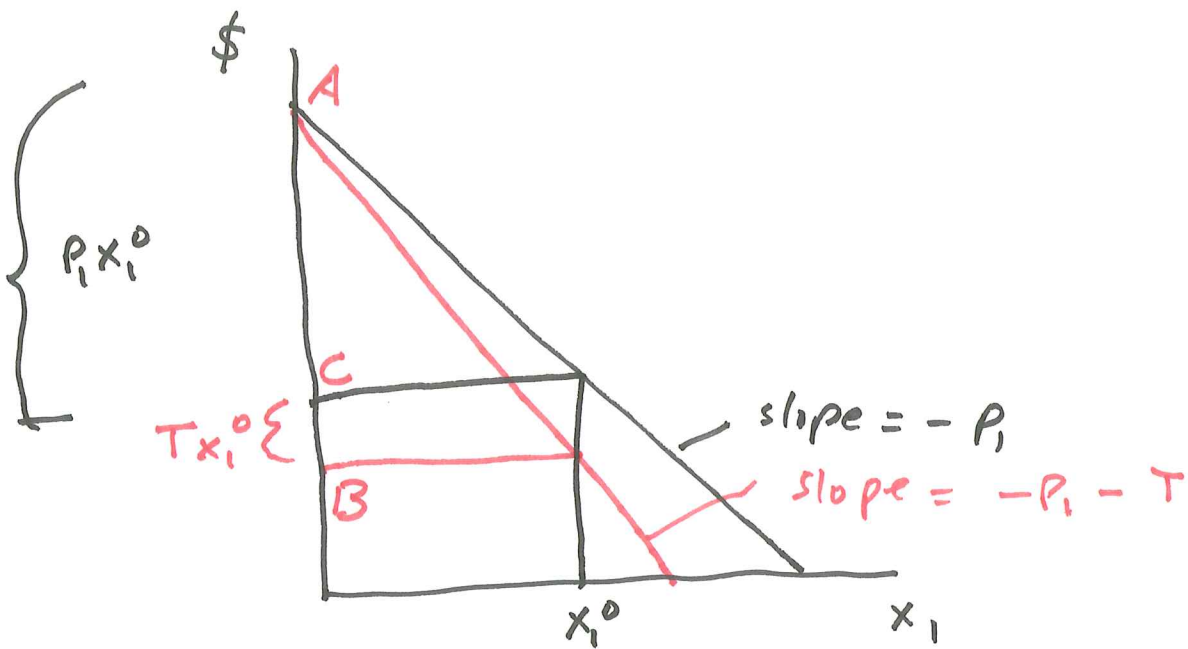
$$MU_x = P_x MU_m$$



Hicks 1933

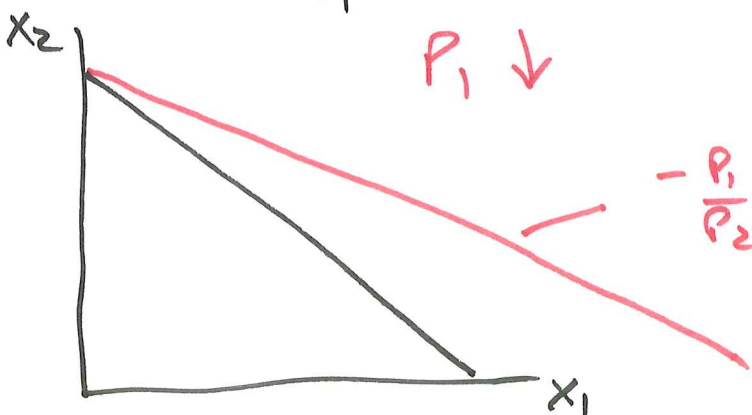
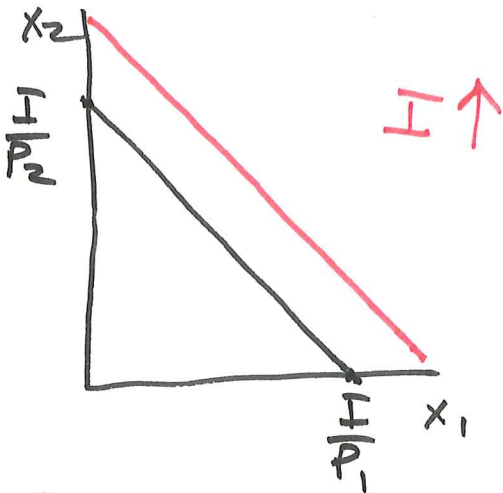
Ordinal Utility

Max Utility subject to Budget



$$-(P_1 + T)x_1^0 = -[P_1 x_1^0 + T x_1^0]$$

### Comparative Statics



# Budget Constraint

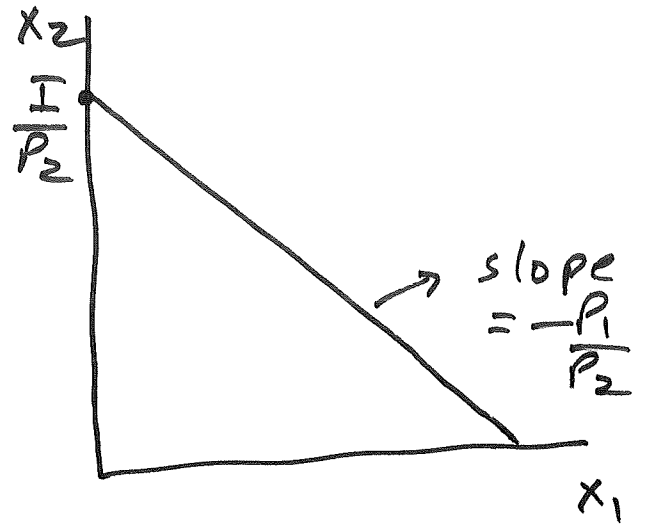
$i = 1, \dots, n$  goods

$$\sum P_i x_i = I$$

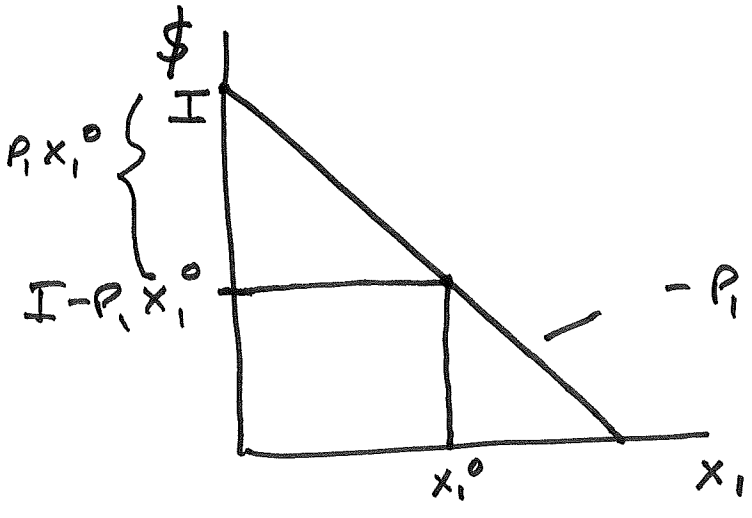
2-good case:

$$P_1 x_1 + P_2 x_2 = I$$

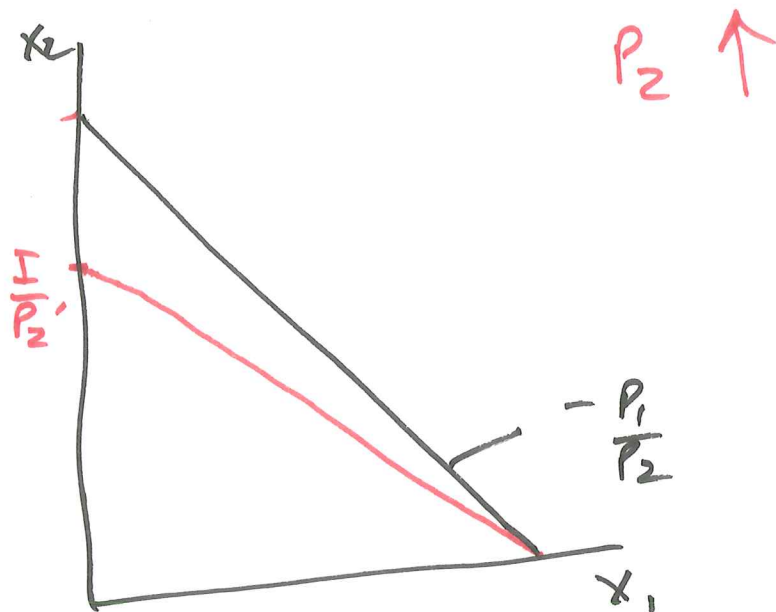
$$x_2 = \frac{I}{P_2} - \frac{P_1}{P_2} x_1$$



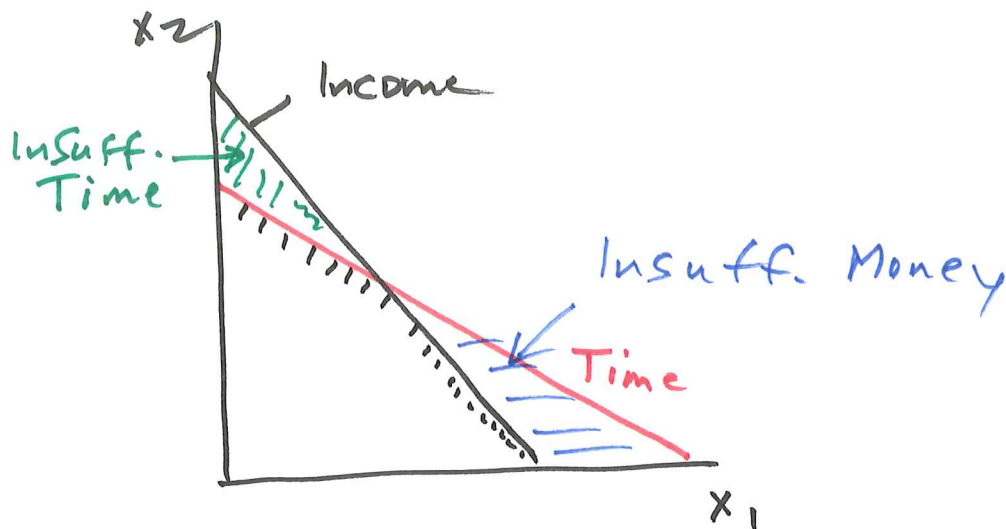
1-good case  
(n-good case)



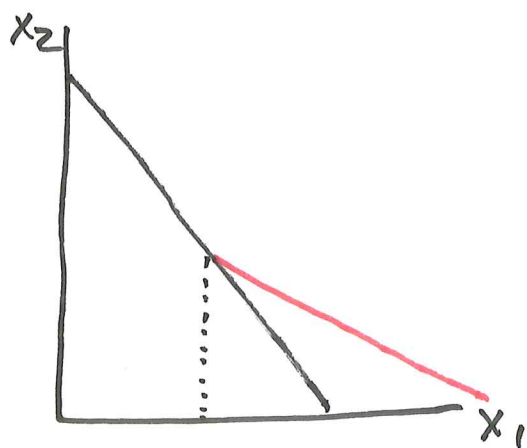
$$P_1 x_1 + \sum_{i \neq 1} P_i x_i = I$$



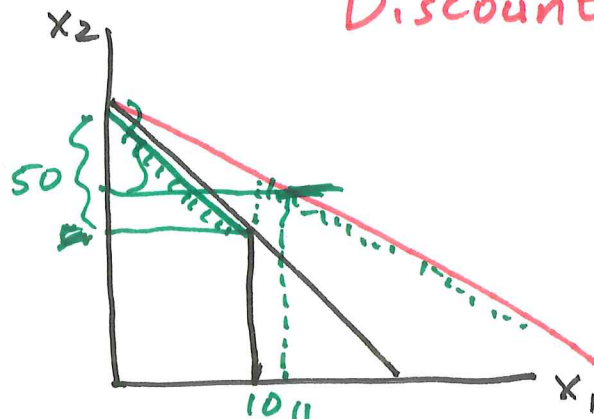
## Multiple Constraints



## Volume Discounts



## Retractive Discount



$$\begin{array}{r} 4.50 \\ 11 \\ \hline 49.50 \end{array}$$

Hicks's Utility Function

$U(x_1, x_2, \dots, x_n) \rightarrow$  utility level.

Bundle A

B

$$U(A) = 100$$

$$U(B) = 50$$

$$V(A) = 1000$$

$$V(B) = -10$$

Next time: read to p. 30.