Review of Consumer Theory

Chapter 1

UTILITY FUNCTIONS

- **Describe how much "happiness" or "satisfaction" an individual experiences from "consuming" goods – the benefit of consumption**

- **Marginal Utility**
  - **The extra total utility resulting from consumption of a small/incremental extra unit of a good**
  - **Mathematically, the (partial) slope of utility with respect to that good**

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  - **Diminishing marginal utility**

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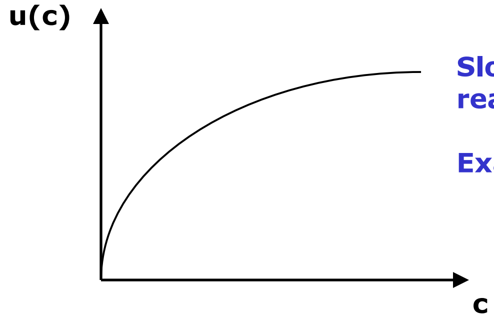
  - Diminishing marginal utility in **each good** individually
- Easily extends to N-good case: $u(c_1, c_2, c_3, c_4, \ldots, c_N)$

UTILITY FUNCTIONS

- **One-good case**



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Example: $u(c) = \ln c$ **or** $u(c) = \text{sqrt}(c)$

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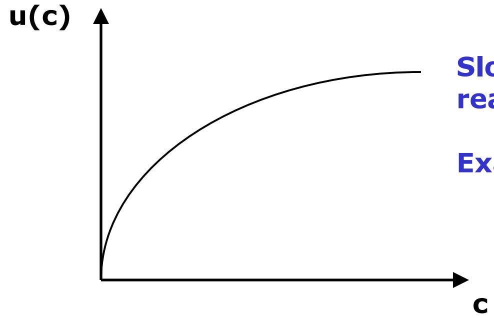

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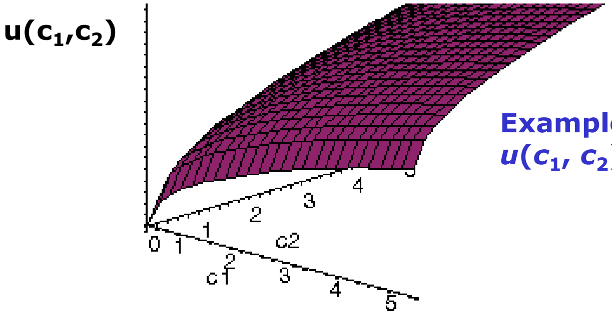

Example: $u(c_1, c_2) = \ln c_1 + \ln c_2$ or $u(c_1, c_2) = \text{sqrt}(c_1) + \text{sqrt}(c_2)$

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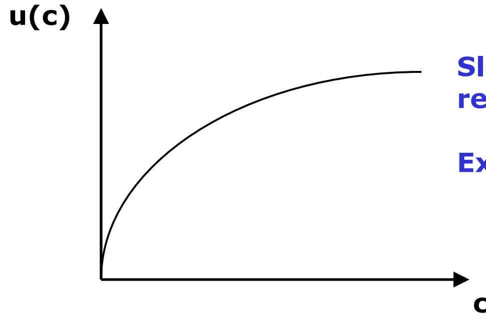

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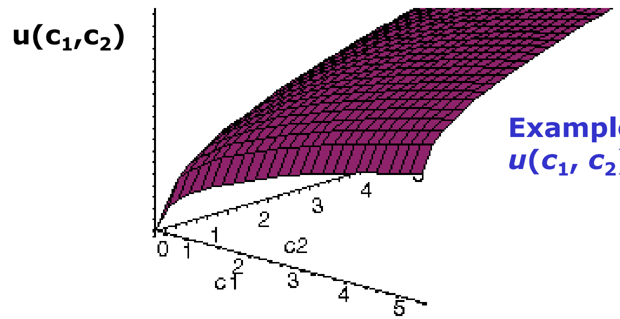

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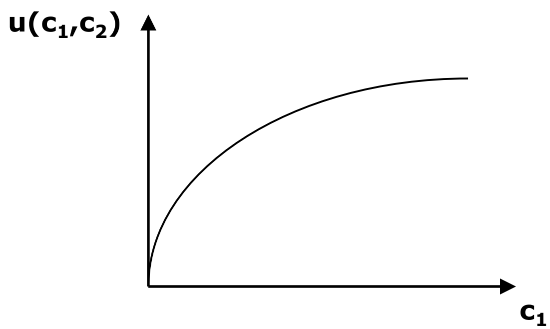
Viewed in good-by-good space



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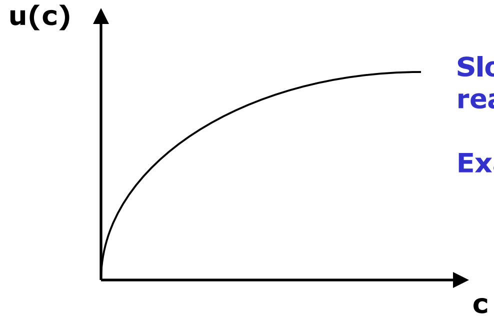

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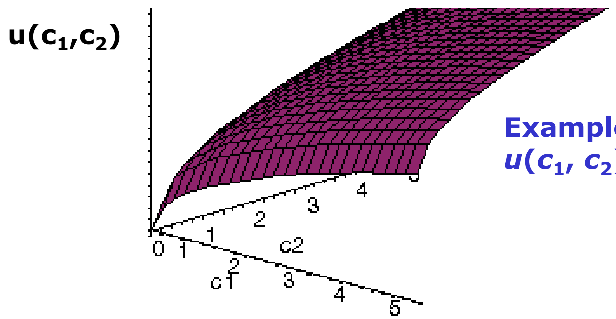

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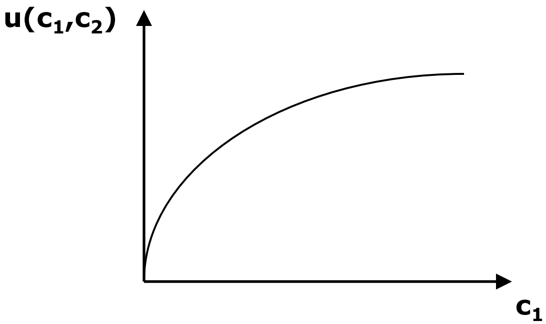
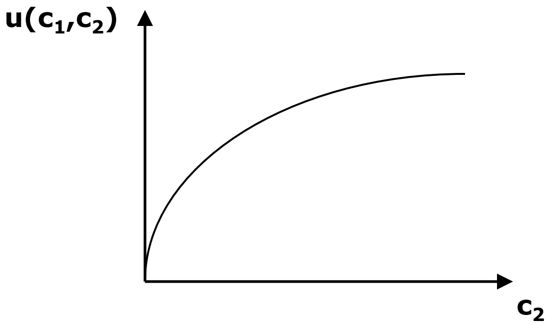
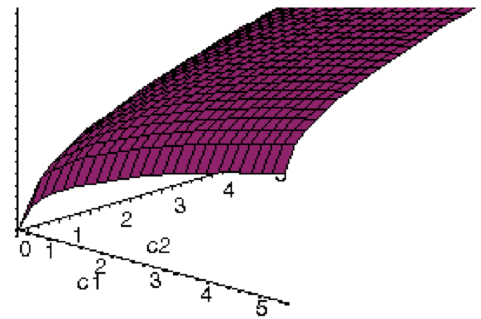




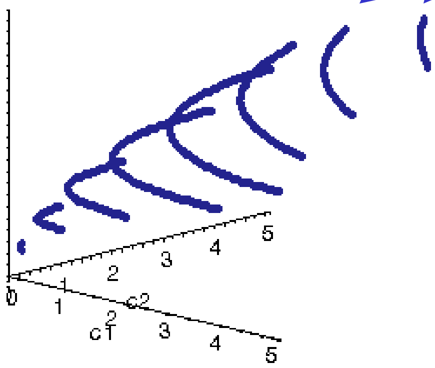
UTILITY FUNCTIONS

Alternative views



Emphasizing the contours

<u>Indifference Curve:</u> the set of all consumption bundles that deliver a particular level of utility/happiness



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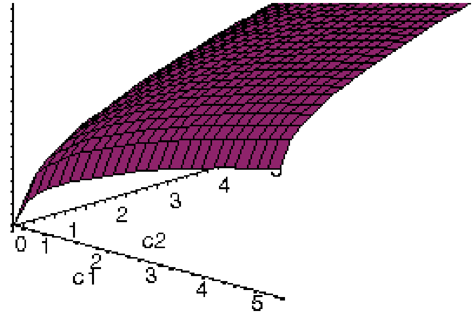

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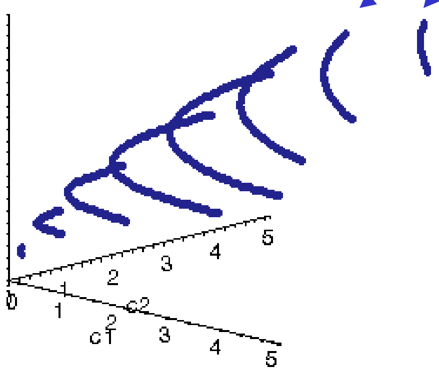
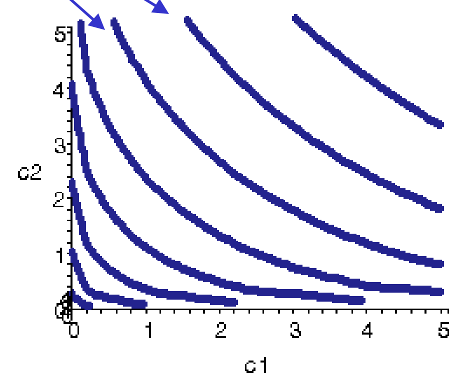
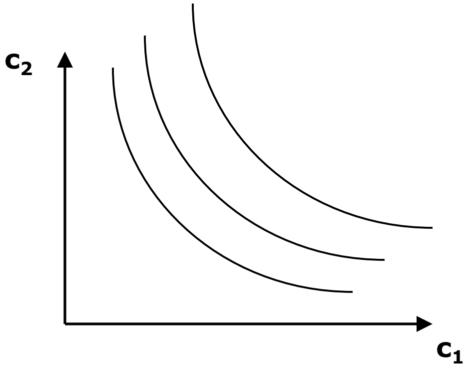
Viewing only the contours





UTILITY FUNCTIONS

- **Marginal Rate of Substitution (MRS)**
  - **Maximum quantity of one good consumer is willing to give up to obtain one extra unit of the other good**
  - **Graphically, the (negative of the) slope of an indifference curve**
  - **MRS is itself a function of c_1 and c_2 (i.e., $MRS(c_1, c_2)$)**



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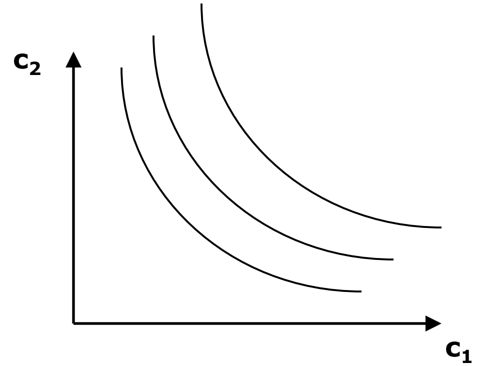

  - **MRS is itself a function of c_1 and c_2 (i.e., $MRS(c_1, c_2)$)**
  - **MRS equals ratio of marginal utilities**
    - $$MRS(c_1, c_2) = \frac{u_1(c_1, c_2)}{u_2(c_1, c_2)}$$
    - **Using Implicit Function Theorem (see Practice Problem Set 1)**

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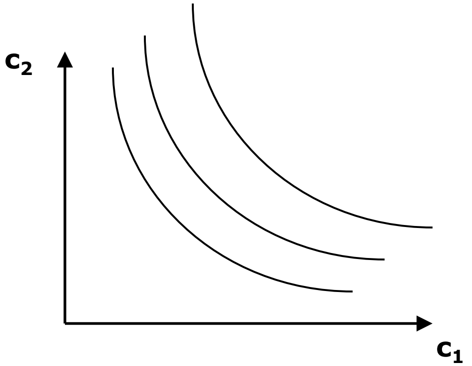

- **Summary: whether graphically- or mathematically-formulated, utility functions describe the benefit side of consumer optimization**

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- **Describe the cost side of consumption**
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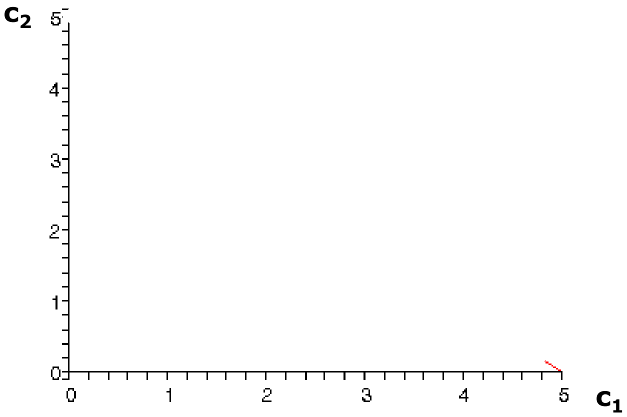

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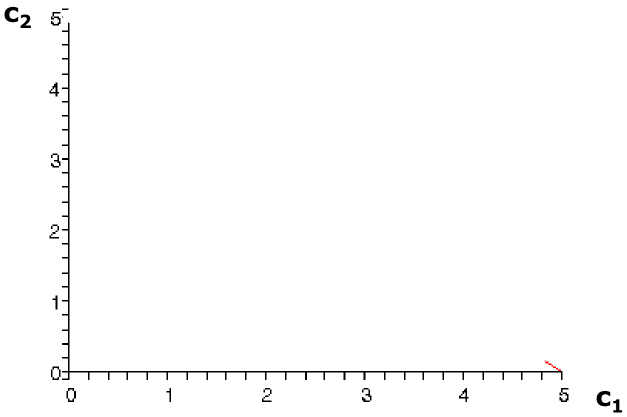

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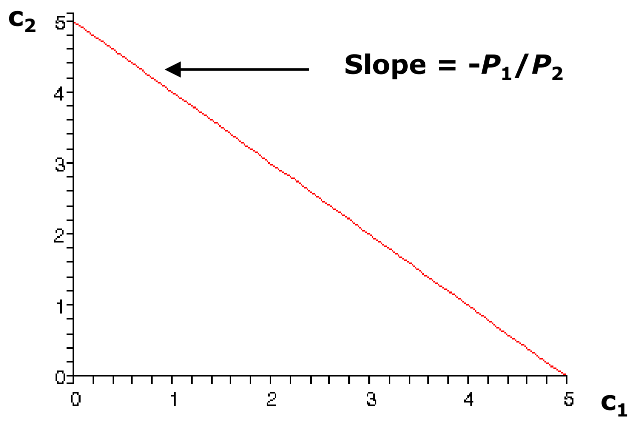

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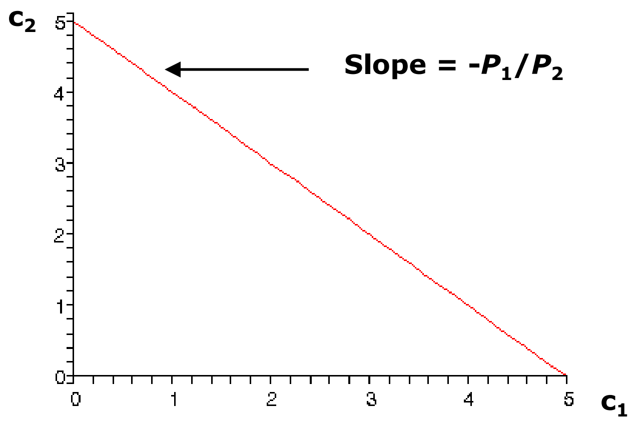

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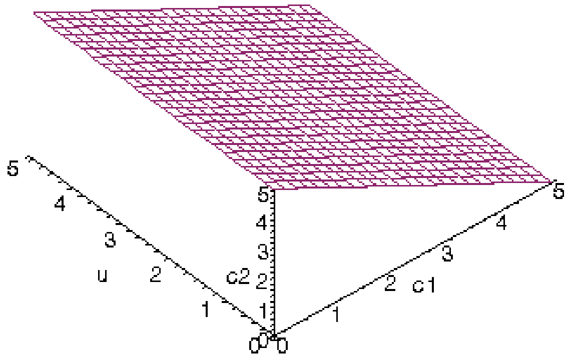

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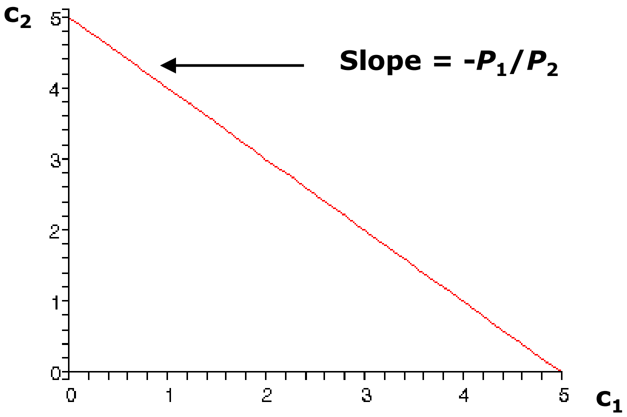

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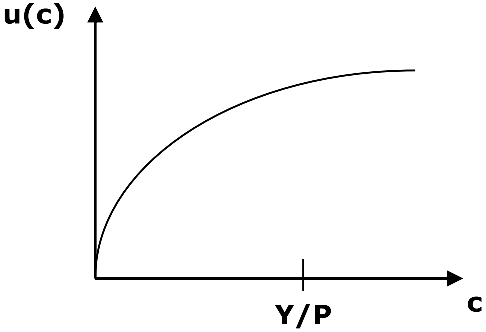

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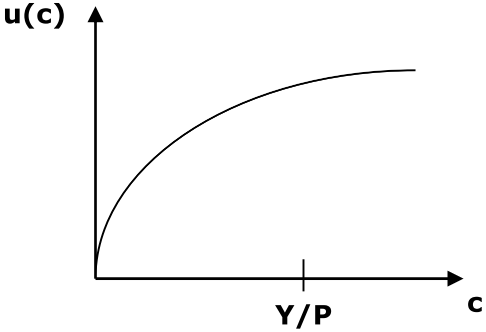

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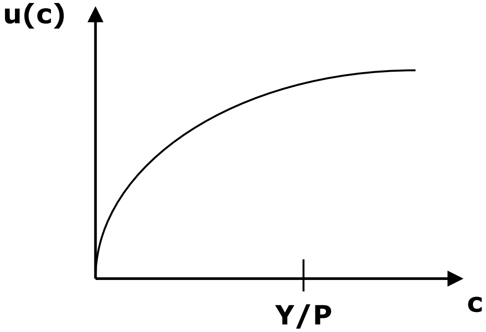

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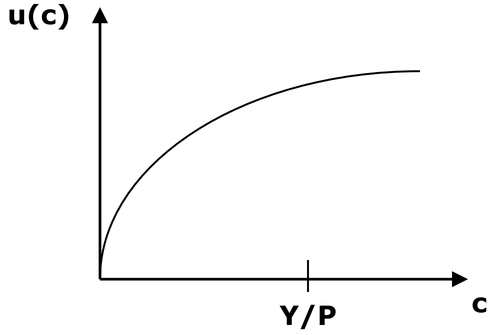

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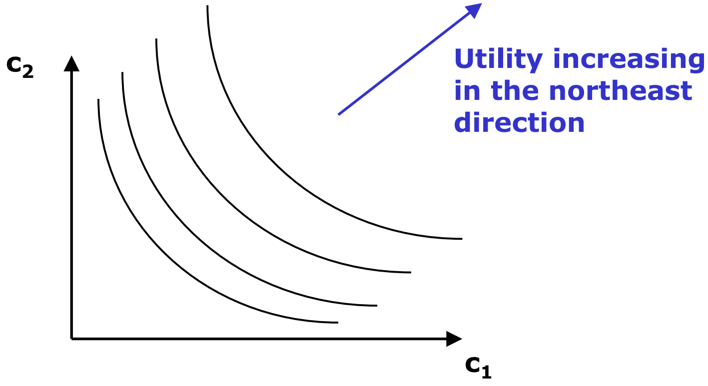

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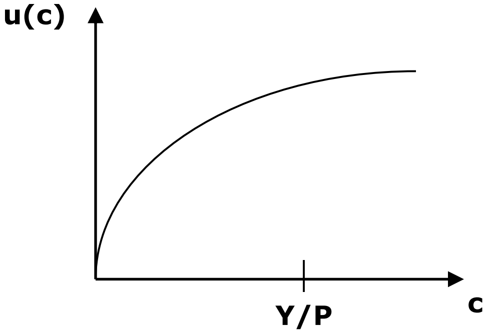

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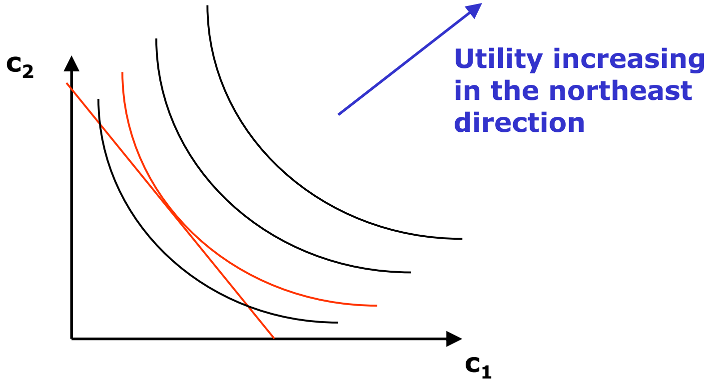

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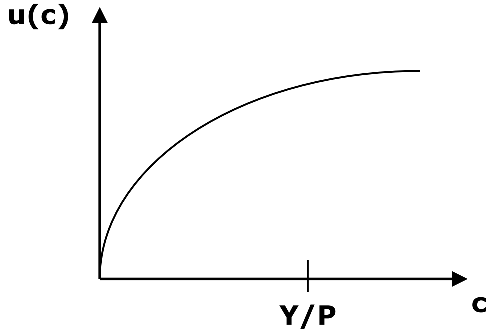

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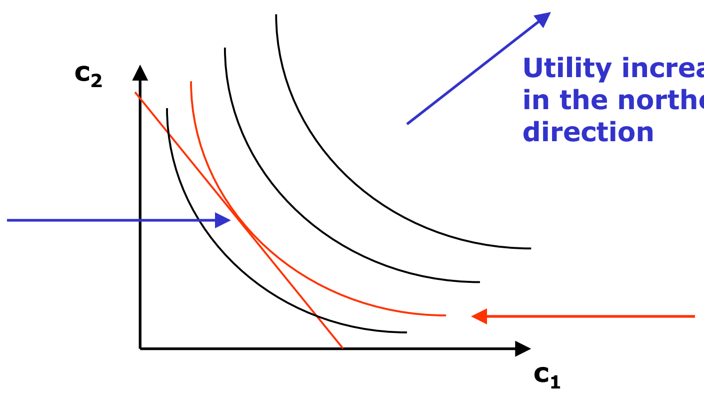

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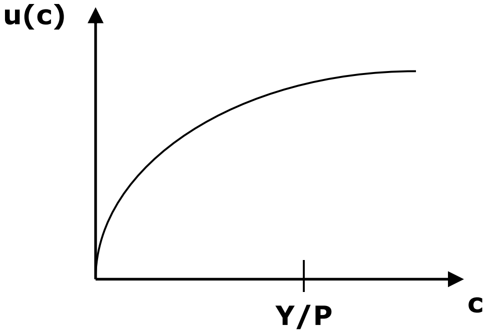

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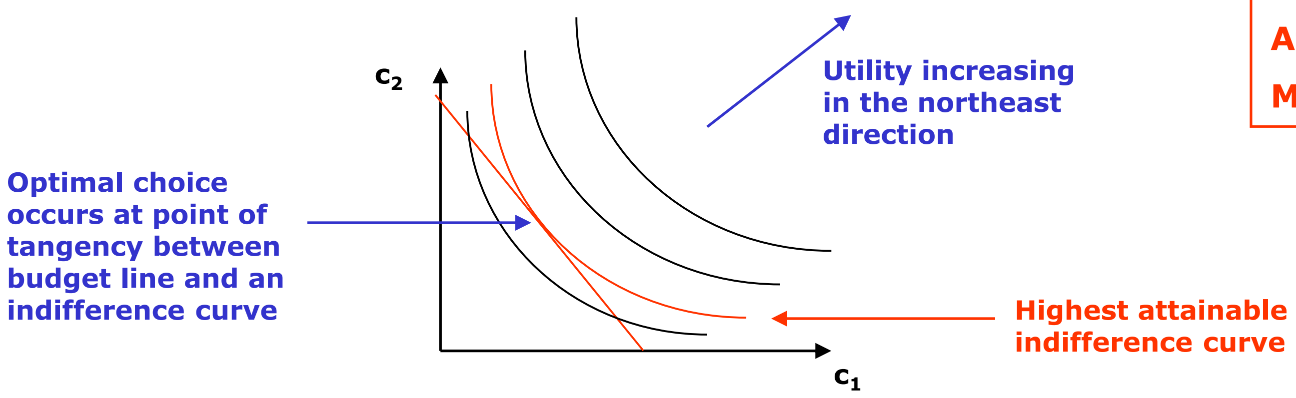

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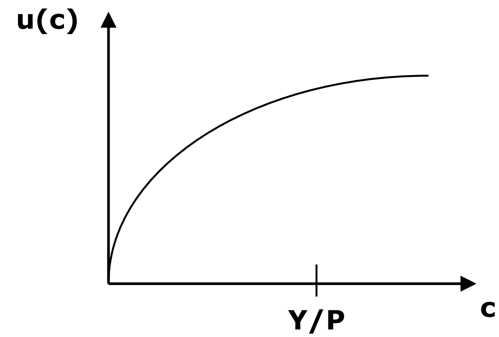

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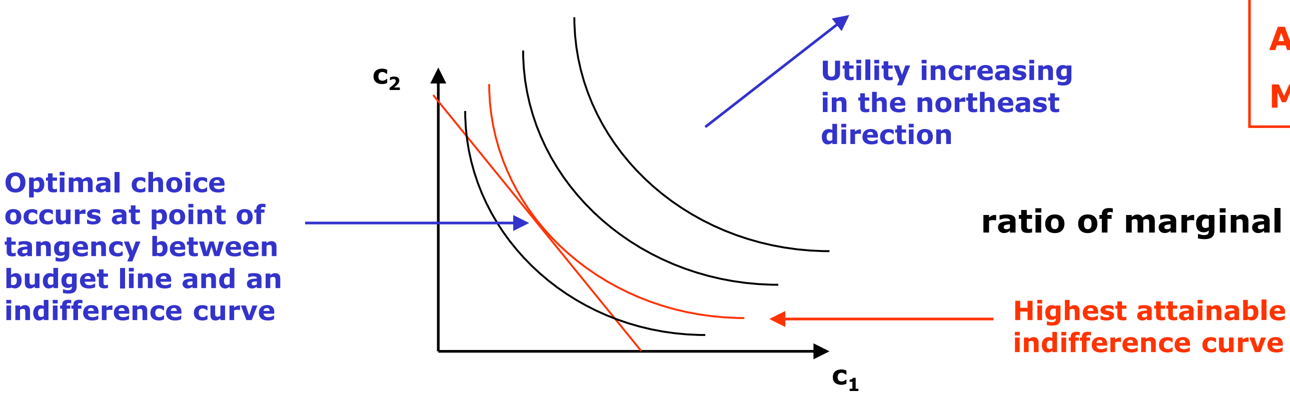

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ratio of marginal utilities = price ratio

LAGRANGE ANALYSIS

- **Consumer optimization a constrained optimization problem**
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  - **Choose (x, y) to maximize a given objective function $f(x,y)$…**
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Lagrange multiplier

$$L(x, y, \lambda) = f(x, y) + \lambda g(x, y)$$

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Lagrange multiplier

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3) $g(x,y) = 0$

Rationale: setting first derivatives to zero isolates maxima (or minima…technically, need to check second-order condition…)

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  - **Rearrange**
  - **Optimality condition: at the optimum (*x**, *y**)**

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Lagrange Analysis

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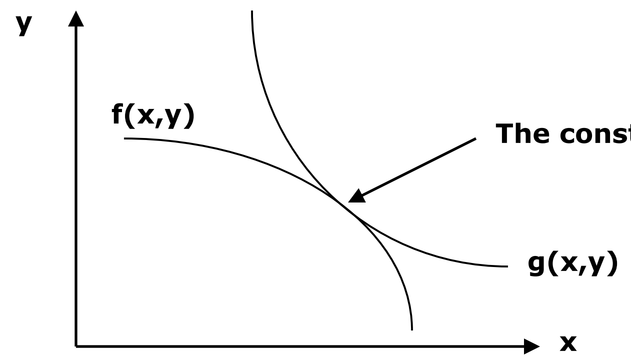
Graphical interpretation: at the constrained optimum, the function *f*(.) is tangent to the function *g*(.)



LAGRANGE ANALYSIS

- **Apply Lagrange tools to consumer optimization**
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3) $Y - P_1c_1 - P_2c_2 = 0$

- **Step 3: Solve (focus on eliminating multiplier from eqns 1 & 2)**

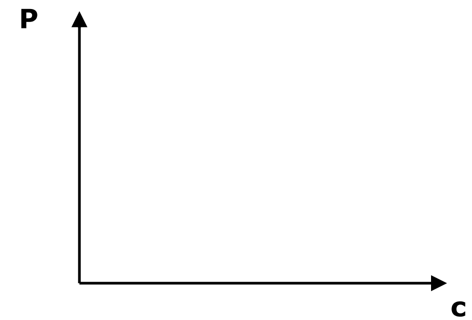
$$\frac{u_1(c_1^*,c_2^*)}{u_2(c_1^*,c_2^*)} = \frac{P_1}{P_2}$$

OPTIMALITY CONDITION

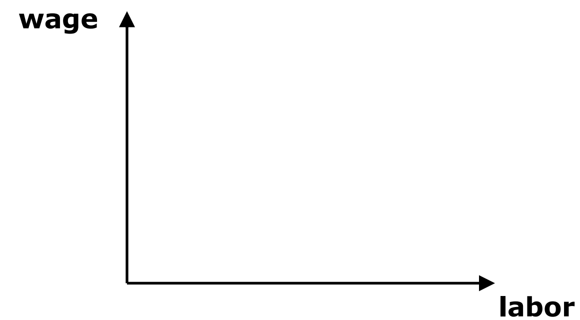
i.e., MRS = price ratio

THE THREE MACRO (AGGREGATE) MARKETS

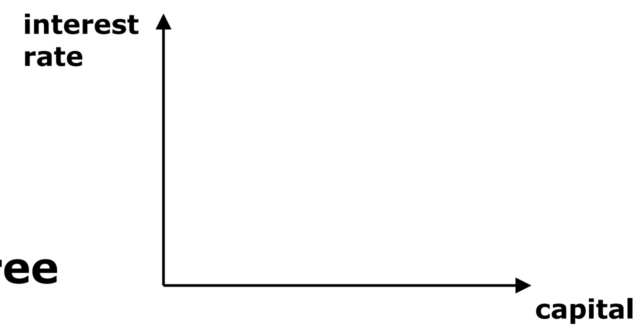
- **Goods Markets**



- **Labor Markets**



- **Financial/Capital/Savings/Asset Markets**



- **Will put micro-foundations under all three**