Teoria do Consumidor

I) Conceitos Básicos

· Cesta de bens: N bens disponíveis $x = (x_1, x_2)$

· Conjunto Consumo → Restrição → Quantidades não negativas

$$X = \{x \in \mathbb{R}^n \mid x \geq 0\}$$

II) Preferências

· Relação de preferências $\succsim$ ⇒ fracamente preferível

$\sim$ ⇒ indiferente

$\succ$ ⇒ estritamente preferível

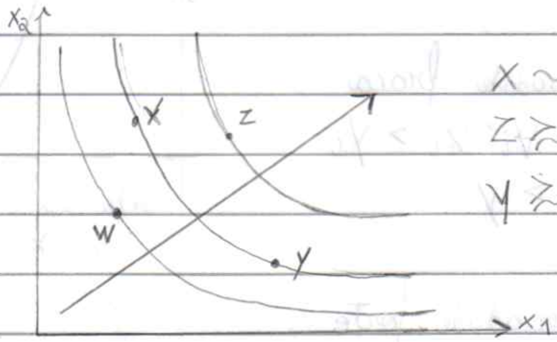
· Preferências Racionais

P_1) Completas: Indivíduo capaz de comparar

P_2) Transitivas: $x \succ y$, $y \succ z$ ⇒ $x \succ z$

P_3) Reflexivas: $x \succsim x$ ou $x \sim x$

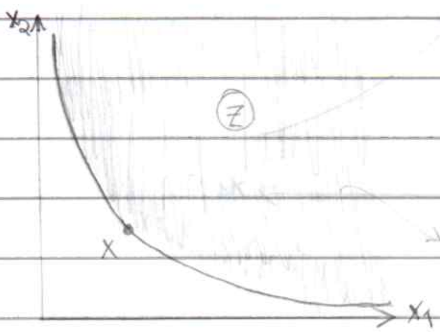
III) Curvas de Indiferença



$x \sim y$

$z \succsim x$

$y \succsim w$

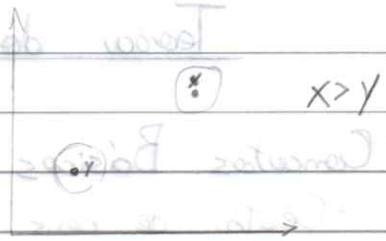


Z é o conjunto fracamente preferível a x ($z \succsim x$)

$$C_x = C_y \quad \text{ou} \quad C_x \cap C_y = \emptyset$$

Preferências bem-comportadas

P4) Continuidade



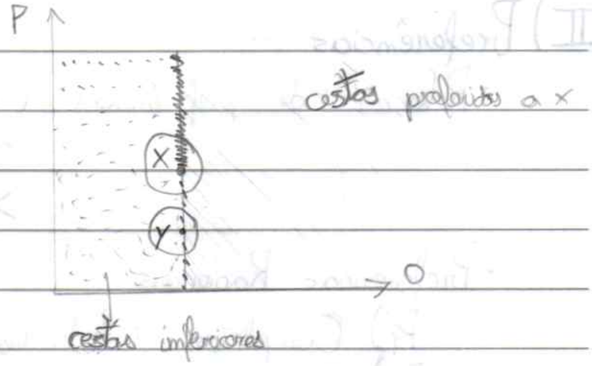
Qualquer dentro (x), (x) > y

Qualquer dentro (y), x > (y)

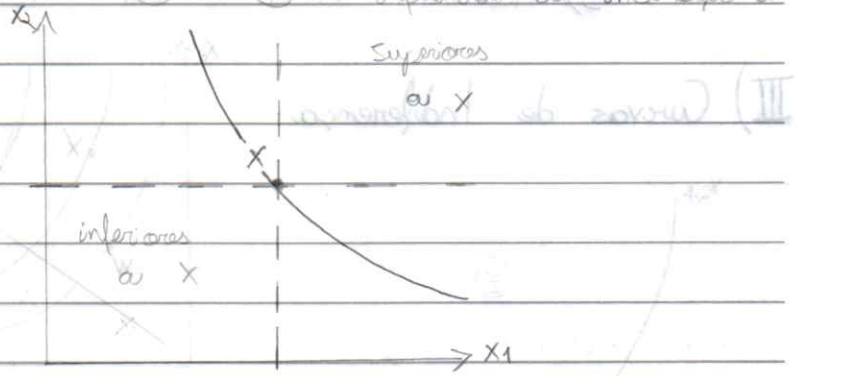
Δm ou ΔP ⇒ garantem-se as relações de preferências

Obs.: Preferências **Lexicográficas** (violam P4)

Critério hierárquico das preferências O > P > B



P5) Monotonicidade (+) > (−) influencia a inclinação da CI



a) Monotonicidade fraca

$x >> y \quad \forall i \; x_i > y_i$

$x > y$

b) Monotonicidade forte

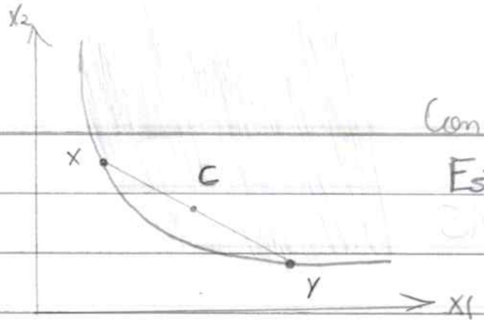
$x_i = y_i \Rightarrow i = 1, \dots, n-1$

$x_j \neq y_j \Rightarrow x_j > y_j \Rightarrow x > y$

P6) Convexidade:

Conjunto fracamente preferível é convexo

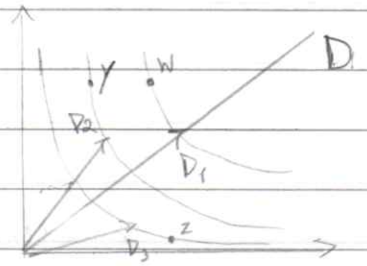
O indivíduo prefere uma cesta diversificada



Convexidade
Estrita

IV) Utilidade

$x > y \leftrightarrow U_x > U_y$



$U_W = D_1 \quad U_y = D_2 \quad U_z = D_3$

$U_i = D_i$

$\sqrt{U}$ é uma transformação monotônica de U

Propriedade Ordinal é válida na microeconomia

Ex.: $U(x_1, x_2) = x_1 x_2$ $\quad x(3,3) \Rightarrow U_x = 9 \quad y = (6,6) \Rightarrow U_y = 36$

$V(x_1, x_2) = \sqrt{U} = \sqrt{x_1 x_2}$ $\quad U_x = 3 \quad U_y = 6$

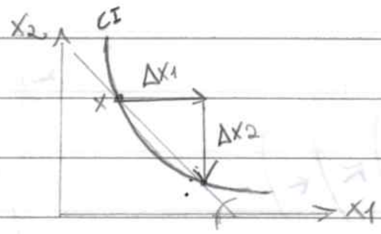
$U_y > U_x$, $y > x$, V é uma transformação monotônica

26/03

Utilidade Marginal: $\dfrac{\Delta U}{\Delta x_i}$ ou $\dfrac{\partial U}{\partial x_i}$

Ex.: $U(x_1, x_2) = x_1 x_2$ $\quad \dfrac{\partial U}{\partial x_1} = x_2 \quad \dfrac{\partial U}{\partial x_2} = x_1$

TMS: $\dfrac{\Delta x_2}{\Delta x_1}$



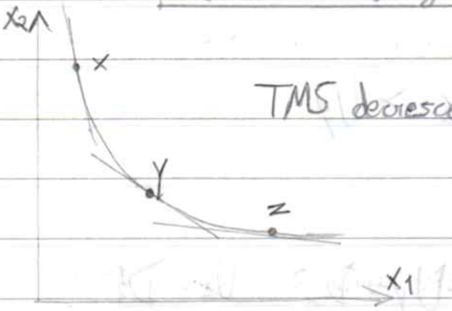
$tg\,\theta = \dfrac{\Delta x_2}{\Delta x_1}$ $\quad TMS = \lim_{\Delta x_1 \to 0} \dfrac{\Delta x_2}{\Delta x_1}$

Teorema da Função Implícita:

$\dfrac{\partial U(x)}{\partial x_1} \cdot dx_1 + \dfrac{\partial U(x)}{\partial x_2} \cdot dx_2 = 0 \qquad \Delta U x_1 + \Delta U x_2 = 0$

$$UMg_1 \cdot dx_1 + UMg_2 \cdot dx_2 = 0$$

$$\boxed{\frac{dx_2}{dx_1} = -\frac{UMg_1}{UMg_2}} = TMS$$



TMS decrescente

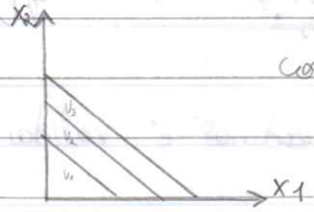
⇒ Casos Especiais:

I) Substitutos Perfeitos

$$U(x_1, x_2) = ax_1 + bx_2 = K$$

$$x_2 = \frac{K}{b} - \frac{a}{b} x_1$$ ⇒ Inclinação Constante

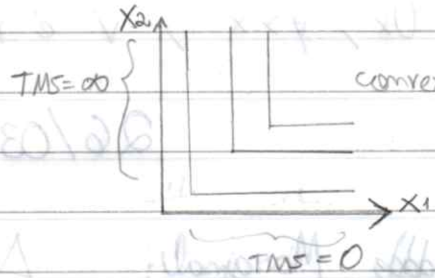
TMS constante $= -a/b$



convexo, não estrito

II) Complementos Perfeitos

$$U(x_1, x_2) = \min\{ax_1, bx_2\}$$



convexo, não estr.

III) Neutros x e y ∈ X $x = (x_1, x_2)$ $y = (y_1, y_2)$

$$U(x_1, x_2) = x_1 \qquad \frac{\partial U}{\partial x_2} = 0$$

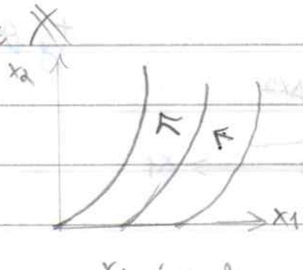
não - convexo

IV) Males x e y ∈ X

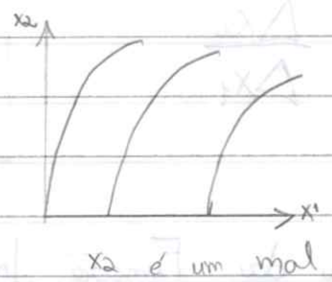
$x = (x_1, x_2)$

$y = (y_1, y_2)$

x_2 -> mal



x_1 é mal



x_2 é um mal

V) Homotéticas $\rightsquigarrow$ função homogênea

$U(x_1, x_2)$ e $\lambda > 0$ $\quad U = (\lambda x_1, \lambda x_2) = \lambda^k (U(x_1, x_2))$

$\Rightarrow$ Utilidades Cobb Douglas: $U(x_1, x_2) = x_1^a x_2^b$, $a, b > 0$, $a + b = 1$

$$TMS = \frac{UMg_1}{UMg_2} = \frac{a\, x_1^{a-1} x_2^b}{b\, x_1^a x_2^{b-1}} = \frac{a}{b} \frac{x_2}{x_1}$$

$\Rightarrow$ Funções CES (Elasticidade de Substituição Constante)

$U(x_1, x_2) = [a \cdot x_1^p + (1-a) x_2^p]^{1/p}$ $\quad \lim_{p \to 0} \Rightarrow$ Cobb Douglas

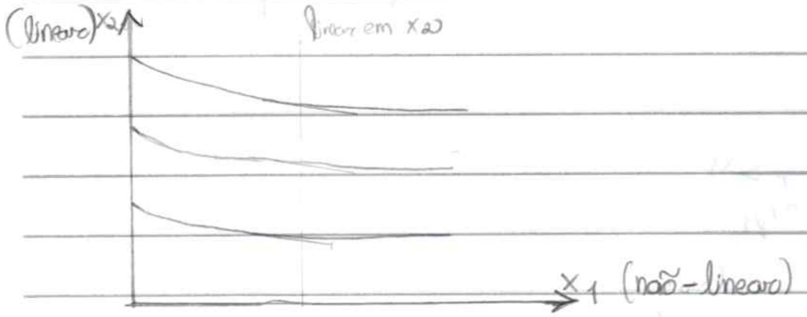
$$TMS = \frac{UMg_1}{UMg_2} = \frac{1/p \cdot U(x_1, x_2)^{1/p - 1} \cdot p a x_1^{p-1}}{1/p \cdot U(x_1, x_2)^{1/p-1} \cdot p(1-a) x_2^{p-1}} = \frac{a}{(1-a)} \frac{x_1^{p-1}}{x_2^{p-1}}$$

$\Rightarrow$ Preferências Quase-Lineares

$U(x_1, x_2) = \underbrace{v(x_1)}_{\text{não linear}} + \underbrace{x_2}_{\text{linear}}$ $\quad TMS = \frac{\partial v / \partial x_1}{1} = \frac{\partial v}{\partial x_1}$

A TMS sempre depende da quantidade do item não-linear.

Exs $\sqrt{x_1} + x_2 \Rightarrow TMS = \frac{1}{2} x_1^{-1/2}$ $\quad \ln(x_1) + x_2 \Rightarrow TMgS = 1/x_1$



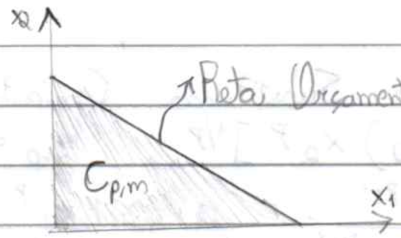
Restrição Orçamentária

$x = (x_1, x_2, \dots, x_n) \in \mathbb{X}$

$P = (P_1, P_2, \dots, P_n)$ $\quad m \rightarrow$ renda

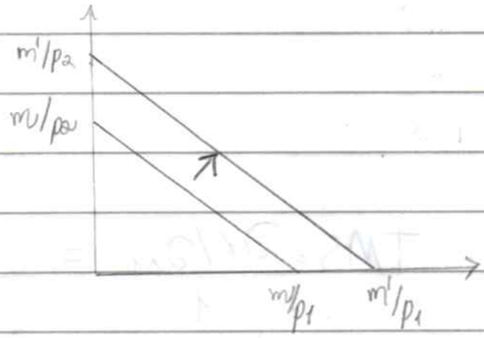
$P_1x_1 + P_2x_2 + \dots + P_nx_n \leq m$ $\Rightarrow$ cestas que atendem essa condição compoem o conjunto orçamentário

$p_1x_1 + p_2x_2 \leq m$ $\quad x_2 \leq \frac{m}{p_2} - \frac{p_1x_1}{p_2}$

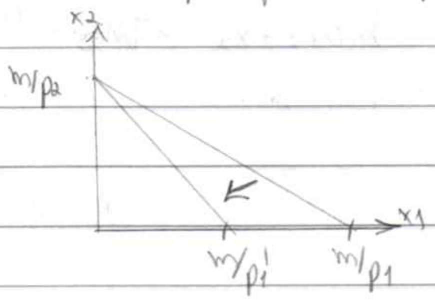


$x_2 = \frac{m}{p_2} - \frac{p_1}{p_2} x_1$ $\frac{p_1}{p_2} \rightarrow$ inclinação da R.O.

RO $\rightarrow \Delta m \Rightarrow m \rightarrow m'$, $m' > m$ $\quad x_2 = \underbrace{\frac{m'}{P_2}}_{\text{intercepto}} - \underbrace{\frac{P_1}{P_2}}_{\text{inclinação da RO}} x_1$



R.O. $\rightarrow \Delta p_1$ $\quad p_1 \rightarrow p_1'$, $p_1' > p_1$ $\quad x_2 = \frac{m}{p_2} - \frac{p_1'}{p_2} x$



$\rightarrow$ R.O. com dotação inicial : W

$W = (W_1, W_2, \dots, W_n)$

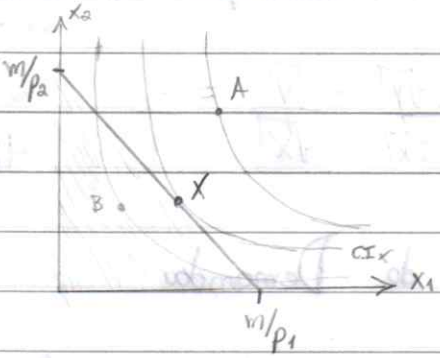
$p_1x_1 + p_2x_2 + \dots + p_nx_n \leq p_1W_1 + p_2W_2 + \dots + p_nW_n$

2 bens $\Rightarrow p_1x_1 + p_2x_2 = p_1W_1 + p_2W_2 = m$

$x_2 = \frac{P_1W_1 + P_2W_2}{P_2} - \frac{P_1}{P_2} x_1$

7

28/03 Escolha / Equilíbrio do Consumidor



⇒ Solução Interior ($x_i > 0$)

Tangência CI e R.O.

$$\boxed{TMS = -\frac{P_1}{P_2}}$$

$$\boxed{\frac{UMg_1}{UMg_2} = \frac{P_1}{P_2}}$$

$\frac{UMg_1}{P_1} = \frac{UMg_2}{P_2}$ Utilidade marginal do gasto com cada bem

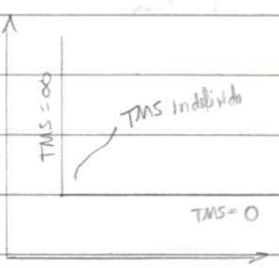
máx $U(x_1, x_2)$ sujeito a $p_1x_1 + p_2x_2 = m$

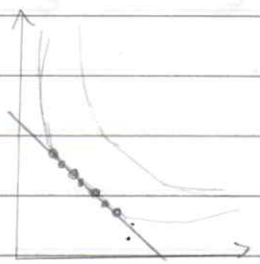
$L = U(x_1, x_2) - \lambda(p_1x_1 + p_2x_2 - m)$

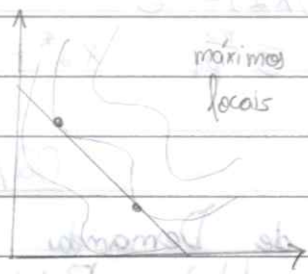
C.P.O.
$$\begin{cases} \partial U/\partial x_1 - \lambda p_1 = 0 & \lambda = UMg_1/p_1 \\ \partial U/\partial x_2 - \lambda p_2 = 0 & \lambda = UMg_2/p_2 \\ p_1x_1 + p_2x_2 - m = 0 \end{cases}$$

Se as preferências são bem-comportadas, $UMg_1/p_1 = UMg_2/p_2$ é necessária e suficiente para determinar um ponto de equilíbrio.

Se as preferências não são bem comportadas, a condição de tangência é necessária mas não suficiente para maximizar utilidade.

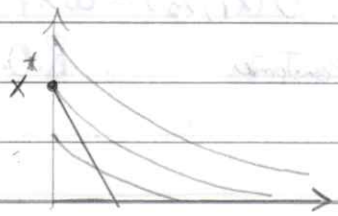






⇒ Solução de Canto

$x_i^* \geq 0$ $\quad x^* = (0, x_2^*)$



$V(x_1, x_2) = V(x_1) + x_2 = K$

$x_2 = K - V(x_1)$

$\Rightarrow U(x,y) = \sqrt{x} + \sqrt{y}$ $P_x = 2$ e $P_y = 1$ $m = 300$

$2x + y = 300$ $UMg_x = \frac{1}{2\sqrt{x}}$ $UMg_y = \frac{1}{2\sqrt{y}}$

$\frac{UMg_1}{UMg_2} = \frac{2\sqrt{y}}{2\sqrt{x}} = \frac{\sqrt{y}}{\sqrt{x}} = \frac{2}{1}$ $2\sqrt{x} = \sqrt{y}$

$4x = y$ $6x = 300$ $x = 50$ $y = 200$

Função de Demanda

a) Cobb Douglas $U(x_1, x_2) = x_1^a x_2^b$, $a, b > 0$ s.a. $p_{x_1} x_1 + p_{x_2} x_2 = m$

$\frac{a x_1^{a-1} x_2^b}{b x_1^a x_2^{b-1}} = \frac{a \cdot x_2}{b \cdot x_1} = \frac{p_1}{p_2}$ $p_1 b x_1 = p_2 a x_2$

$x_1 = \frac{p_2 a x_2}{p_1 b}$ $x_2 = \frac{b p_1 x_1}{a p_2}$

$p_1 x_1 + p_2 \frac{b p_1 x_1}{a p_2} = m$ $\frac{p_1 x_1 a + b p_1 x_1}{a} = m$

$(a+b) p_1 x_1 = a m$ $\boxed{x_1^* = \frac{a}{(a+b)} \frac{m}{p_1}}$ $\boxed{x_2^* = \frac{b}{a+b} \frac{m}{p_2}}$

Proporção do gasto: $\frac{p_1 x_1^*}{m} = \frac{\cancel{p_1}\left(\frac{a}{a+b} \frac{\cancel{m}}{\cancel{p_1}}\right)}{\cancel{m}} = \boxed{\frac{a}{a+b}}$

$U(x_1, x_2) = \sqrt{x_1 x_2} = x_1^{1/2} x_2^{1/2}$ $x_1^* = \frac{1}{2} \frac{m}{p_1}$ $x_2^* = \frac{1}{2} \frac{m}{p_2}$

$U(x_1, x_2) = 2\ln(x_1) + 3\ln(x_2)$ -

$V(x_1, x_2) = e^{2\ln(x_1) + 3\ln(x_2)} = e^{2\ln(x_1)} \cdot e^{3\ln(x_2)} = x_1^2 x_2^3$

$x_1^* = \frac{2}{5} \frac{m}{p_1}$ $x_2^* = \frac{3}{5} \frac{m}{p_2}$

02/04

Função de Demanda

b) Substitutos Perfeitos $U(x_1, x_2) = a x_1 + b x_2$

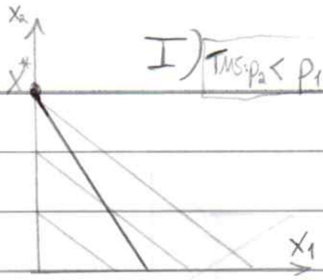
$TMS = \frac{UMg_1}{UMg_2} = \frac{a}{b} \Rightarrow$ constante $R.O. = -\frac{p_1}{p_2} \Rightarrow$ constante

I) TMS < p_1/p_2

II) TMS = p_1/p_2

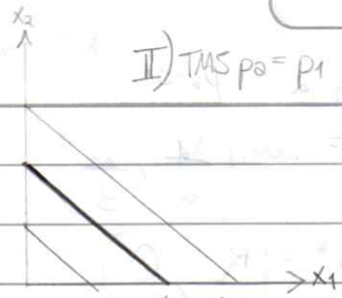
III) TMS > p_1/p_2

I) TMS: $p_2 < p_1$



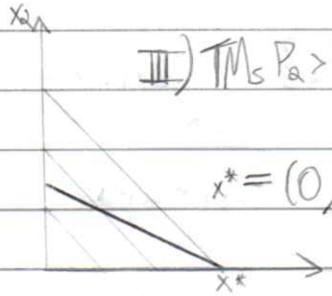
$x^* = (0, m/p_2)$

II) TMS $p_2 = p_1$



$x^* = (x_1, x_2) \therefore px^* = m$

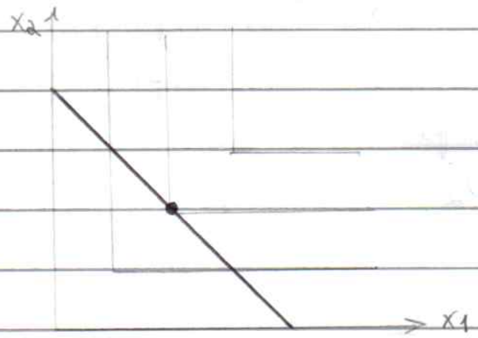
III) TMS $p_2 > p_1$



$x^* = (0, m/p_1)$

Função de Demanda
$$\begin{cases} (0, m/p_2), \text{ se } TMS < p_1/p_2 \\ (x_1, x_2), \text{ tal que } px^* = m \\ (m/p_1, 0), \text{ se } TMS > p_1/p_2 \end{cases}$$

c) Complementos Perfeitos



$$U(x_1, x_2) = \min\{ a x_1, b x_2 \}$$

no ótimo $a x_1 = b x_2$

$$x_2 = \frac{a x_1}{b} \qquad p_1 x_1 + p_2 x_2 = m$$

$$\frac{b p_1 x_1 + p_2 a x_1}{b} = m$$

$bm = b p_1 x_1 + p_2 a x_1$

$x_1^* = \dfrac{b \cdot m}{(b p_1 + a p_2)}$	$x_2^* = \dfrac{a\ m}{(b p_1 + a p_2)}$

2015.1. $U(x,y) = (x^p + y^p)^{1/p}$ CES

$TMS = \dfrac{UMg\,x}{UMg\,y} = \dfrac{x^{p-1}}{y^{p-1}}$

$A \succ B$, $A \sim C$, $C \sim B$

2012.1. $U(x_1, x_2) = (x_1 x_2)^a$ $\quad TMS = \dfrac{UMg_1}{UMg_2} = \dfrac{p_1}{p_2} = \dfrac{2 x_1 x_2^2}{2 x_1^2 x_2} = \dfrac{x_2}{x_1}$

① $x_2^* = \dfrac{x_1 p_1}{p_2}$

$x_1 p_1 + x_1 p_1 = R \qquad x_1^* = \dfrac{1}{2}\dfrac{R}{p_1} \qquad x_2^* = \dfrac{1}{2}\dfrac{R}{p_2}$

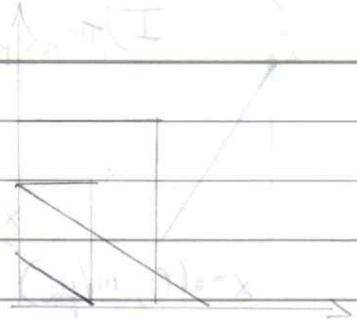
10

R.O. = −2/3

$p_1 = 2 \quad p_2 = 3$

① $U(x_1, x_2) = \max\left(\frac{x_1}{2}, \frac{x_2}{3}\right)$

$x^* = \left(\frac{R}{P_1}, 0\right)$



② $U(x_1, x_2) = \min\{4x_1^2, 9x_2^2\} = \min\{2x_1, 3x_2\}$ $\quad 2x_1 = 3x_2 \quad x_2 = \frac{2}{3}x_1 \quad x_1 = \frac{3}{2}x_2$

$p_1 x_1 + p_2 \frac{2}{3} x_1 = R \qquad x_1^* = \frac{R}{p_1 + \frac{2}{3}p_2} = \frac{3R}{3p_1 + 2p_2}$

$p_1 \frac{3}{2} x_2 + p_2 x_2 = R \qquad x_2^* = \frac{R}{\frac{3}{2}p_1 + p_2} = \frac{2R}{3p_1 + 2p_2}$

③ $U(x_1, x_2) = \ln(x_1) + x_2$

$\frac{UMg_1}{UMg_2} = \frac{p_1}{p_2} = \frac{1}{x_1} = \frac{p_1}{p_2} \qquad x_1^* = \frac{p_2}{p_1} \qquad x_2^* = R - \left(\frac{p_2}{p_1}\right)p_1 = R - p_2$

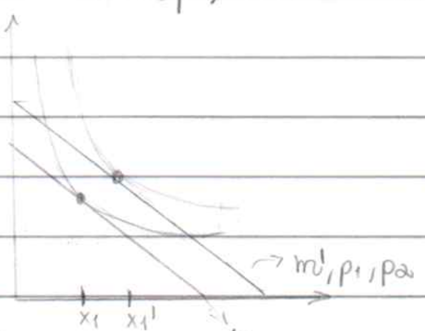
$p_1 x_1 + p_2 x_2 = R \qquad x_2 = \frac{R - p_2}{p_2}$

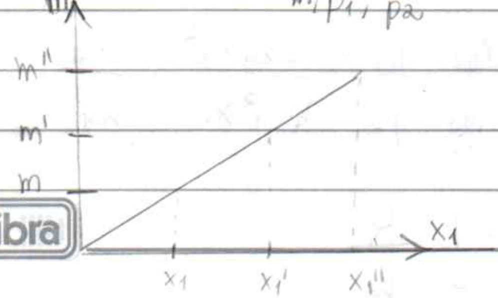
④ $U(x_1, x_2) = x_1 + 2x_2 \qquad TMS = \frac{1}{2}$

$\boxed{04/04}$

Demanda

$x_1^*(p, m)$ e $x_2^*(p, m)$





Curva de Renda-Consumo
Curva de Engel

Elasticidade - Renda da Demanda

$$\varepsilon_{m,i} = \frac{\Delta\% \, X_i}{\Delta\% \, m} = \frac{\Delta X_i / X_i}{\Delta m / m} = \frac{\Delta X_i}{\Delta m} \cdot \frac{m}{X_i}$$

$$\varepsilon_{m,i} = \frac{d \, x_i(p,m)}{d \, m} \cdot \frac{m}{x_i(p,m)}$$

Ex1. Cobb Douglas $\quad X_1(p,m) = \frac{a}{a+b} \frac{m}{p_1}$

$$\varepsilon_{m,1} = \frac{a}{a+b} \frac{1}{p_1} \cdot \frac{m}{\frac{a}{a+b} \cdot \frac{m}{p_1}} = \frac{a}{a+b} \frac{1}{p_1} \cdot \frac{a+b}{a} \cdot \frac{p_1}{1} = 1$$

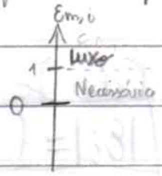
A elasticidade-renda da Cobb Douglas é sempre 1.

Ex2.: Quase Linear $\quad U(x_1, x_2) = \ln(x_1) + x_2 \qquad x_1^* = \frac{p_2}{p_1} \quad x_2^* = \frac{m - p_2}{p_2}$

$$\varepsilon_{m,1} = 0 \cdot \frac{m}{p_2/p_1} = 0 \qquad \varepsilon_{m,2} = \frac{1}{p_2} \cdot \frac{m}{\frac{m-p_2}{p_2}} = \frac{1}{p_2} \cdot m \cdot \frac{p_2}{m-p_2} = \frac{m}{m-p_2}$$

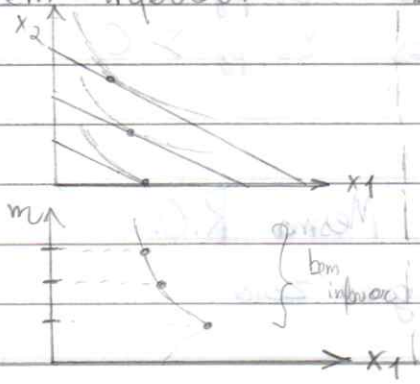
Bens Normais $\Rightarrow \uparrow m \ \uparrow x_i \qquad \varepsilon_{m,i} > 0$

Bens Inferiores $\Rightarrow \uparrow m \ \downarrow x_i \qquad \varepsilon_{m,i} < 0$

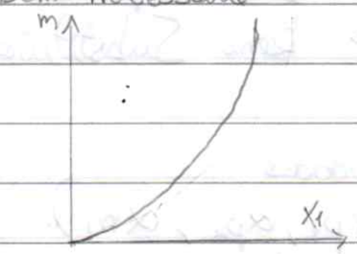


Demanda
- Elástica $\quad |\varepsilon| > 1$
- Unitária $\quad |\varepsilon| = 1$
- Inelástica $\quad |\varepsilon| < 1$

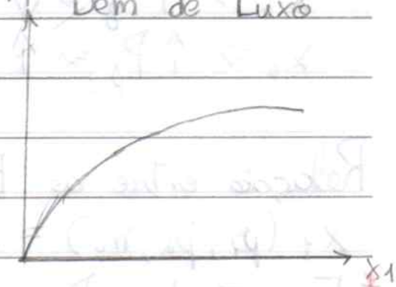
Bem Inferior:



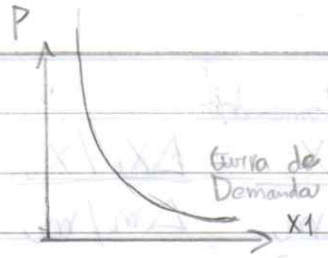
Bem Necessário



Bem de Luxo



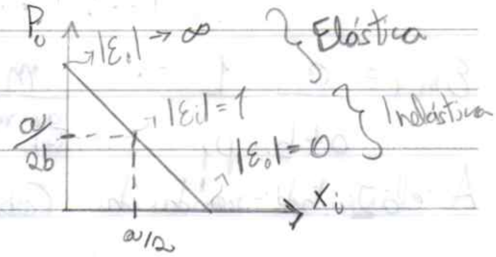
Demanda e Preço



Elasticidade-Preço da Demanda: $\varepsilon_i = \dfrac{\Delta\% X_i}{\Delta\% P_i} = \dfrac{\Delta x_i / x_i}{\Delta p_i / p_i} = \dfrac{\Delta x_i}{\Delta p_i} \cdot \dfrac{p_i}{x_i}$

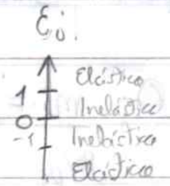
$$\varepsilon_i = \frac{dX_i}{dP_i} \cdot \frac{P_i}{X_i}$$

$X_i = a - bP_i$ $\qquad \varepsilon_i = -b \cdot \dfrac{P_i}{a - bP_i}$



$1 = \left| -b \dfrac{P_i}{a - bP_i} \right|$ $\qquad (a-b)P_i = bP_i$

$a = 2bP_i$ $\qquad P_i = \dfrac{a}{2b}$



Bem Comum $\quad \uparrow P_i \downarrow x_i \quad \varepsilon_i < 0$
Bem de Giffen $\quad \uparrow P_i \uparrow x_i \quad \varepsilon_i > 0$

Ex.: Cobb Douglas $\boxed{|\varepsilon_i| = 1}$

$$\varepsilon_1 = \frac{a}{a+b} \cdot m \cdot \frac{-1}{P_1^2} \cdot \frac{P_1}{X_1} = -\frac{a}{a+b} \frac{m}{x_1 P_1} = -\frac{x_1}{x_1} = -1$$

$x_1^* = (p_1, p_2, m) \Rightarrow$ Elasticidade Preço-Cruzada da Demanda

$$\varepsilon_{i,p_j} = \frac{\Delta\% X_i}{\Delta\% p_j} = \frac{dX_i}{dP_j} \cdot \frac{P_j}{X_i}$$

No caso da Cobb Douglas, $\varepsilon_{1,p_2} = 0$ (bens independentes)

$x_i \Rightarrow \uparrow P_j \Rightarrow \downarrow X_i \Rightarrow$ Bens Complementares $\quad \varepsilon_{i,p_j} < 0$
$x_i \Rightarrow \uparrow P_j \Rightarrow \uparrow X_i \Rightarrow$ Bens Substitutos $\quad \varepsilon_{i,p_j} > 0$

Relação entre as Elasticidades

$x_1(p_1, p_2, m) = x_1(\alpha p_1, \alpha p_2, \alpha m)$ $\quad$ Mesma R.O.

* Função de Demanda é homogênea de grau zero

$$0 = \frac{dx_1}{dP_1} P_1 + \frac{dx_2}{dP_2} P_2 + \frac{dx_1}{dm} \cdot m \Rightarrow \text{dividindo tudo por } x_1$$

$$0 = \varepsilon_1 + \varepsilon_{1,2} + \varepsilon_{m,1}$$

$$\boxed{\varepsilon_1 + \varepsilon_{1,2} + \varepsilon_{m,1} = 0}$$

09/04

Função de utilidade indireta: máx $U(x_1, x_2)$ s.a. R.O. $\Rightarrow$ $x_1^*(p, m)$, $x_2^*(p, m)$ } função de demanda

$V(p, m) = U(x_1^*, x_2^*)$

Cobb Douglas $\Rightarrow U(x_1, x_2) = x_1^a x_2^b$ $\quad x_1^* = \frac{a}{a+b} \frac{m}{p_1}$ $\quad x_2^* = \frac{b}{a+b} \frac{m}{p_2}$

$$V(p, m) = x_1^{*a} x_2^{*b} = \left(\frac{a}{a+b} \frac{m}{p_1}\right)^a \left(\frac{b}{a+b} \frac{m}{p_2}\right)^b$$

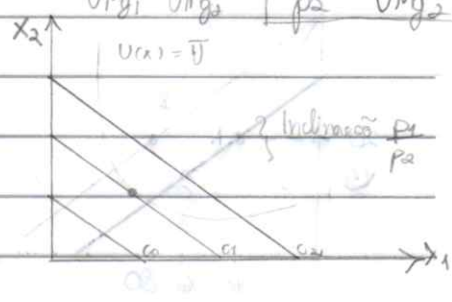
Minimização do gasto: x que minimiza $\underline{p} \cdot X$ s.a. $U(x) \geq \overline{U}$

min $p \cdot x$ s.a. $U(x) \geq \overline{U}$ $\quad U(x) = \overline{U}$

$L = p \cdot x - \lambda (U(x) - \overline{U}) = p_1 x_1 + p_2 x_2 - \lambda (U(x_1, x_2) - \overline{U})$

$L_{x_1} = p_1 - \lambda UMg_1 = 0 \quad L_{x_2} = p_2 - \lambda UMg_2 = 0 \quad \frac{p_1}{UMg_1} = \frac{p_2}{UMg_2}$ $\quad \boxed{\frac{p_1}{p_2} = \frac{UMg_1}{UMg_2}}$

Reta isocusto $\Rightarrow p_1 x_1 + p_2 x_2 = C_0$



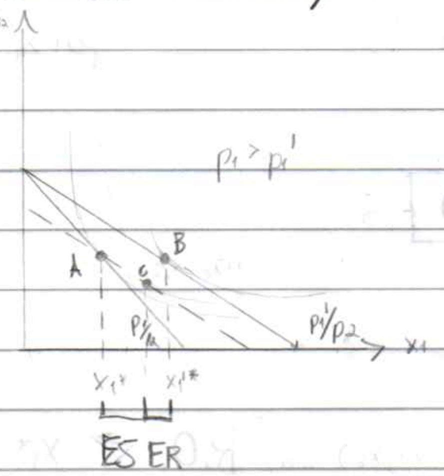
$h(p, \overline{U}) = (h_1^*, h_2^*)$

Função de demanda hicksiana ou
Função de demanda compensada:

min px = min $p \cdot h(p, \overline{U}) = e(P, \overline{U})$
↳ Função Gasto / dispêndio

Equação de Slutsky

$\Delta p \rightarrow \Delta x^* \rightsquigarrow$ 2 efeitos: $\Delta p_1/p_2$ ES; Δ poder aquisitivo ER



ES → $\Delta p_1/p_2$ mantendo constante o poder aquisitivo

$\boxed{\text{ER} \Rightarrow \Delta \text{poder aquisitivo constante o } p_1/p_2}$

$\Delta m = m' - m$

$= x_1 p_1' - x_1 p = x_1 \Delta p$

ES: A → C $\quad ES = \Delta x_1^s = x_1(p_1', p_2, m') - x_1(p_1, p_2, m)$

poder aquisitivo constante

$x(p_1, p_2, m) \rightarrow x(p_1', p_2, m')$

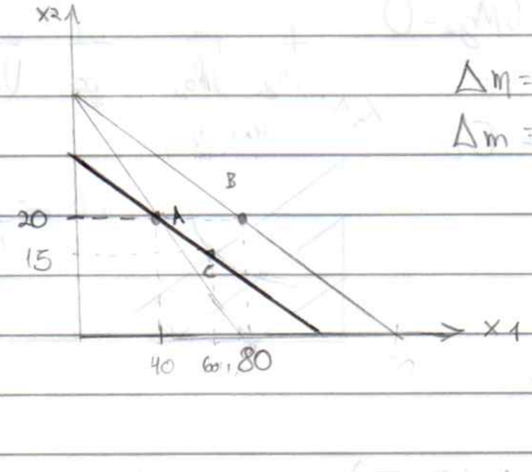
ER: C → B $\quad ER = \Delta x_1^m = x_1(p_1', p_2, m) - x_1(p_1', p_2, m')$

razão de preços constante

$U(x_1, x_2) = x_1^{0,5} x_2^{0,5} \quad p_1 = 1 \quad p_2 = 2 \quad m = 80 \quad x_1 + 2x_2 = 80$

$x_1 = \frac{a}{a+b} \frac{m}{p_1} = 0,5 \frac{80}{1} = 40 \qquad x_2 = \frac{b}{a+b} \frac{m}{p_2} = 0,5 \cdot \frac{80}{2} = 20$

$p_1' = 0,5 \qquad 0,5x_1 + 2x_2 = 80 \qquad x_1' = 0,5 \cdot \frac{80}{0,5} = 80 \qquad x_2' = 20$



$\Delta m = x_1 \Delta p_1$

$\Delta m = 40(0,5 - 1) = -20 \qquad m' = 80 - 20 = 60$

$p_1' = 0,5 \quad p_2 = 2 \quad m' = 60$

$x_1'^* = 0,5 \cdot \frac{60}{0,5} = 60 \qquad x_2'^* = 0,5 \cdot \frac{60}{2} = 15$

$\therefore ES = x_1(0,5, 2, 60) - x_1(1, 2, 80)$

$ES = 60 - 40 = 20$

$ER = x_1(0,5, 2, 80) - x(0,5, 2, 60) = 80 - 60 = 20$

ER $\begin{cases} (+) & \uparrow m \ \uparrow x_1 \Rightarrow \text{Bem Normal} \\ (-) & \uparrow m \ \downarrow x_1 \Rightarrow \text{Bem Inferior} \end{cases}$

11/04

Identidade de Slutsky: $\Delta x_1 = ER + ES$

$\Delta x_1 = x_1(p_1', m) - x_1(p_1, m)$

$\Delta x_1 = [x_1(p_1', m') - x_1(p_1, m)] + [x_1(p_1', m) - x_1(p_1', m')]$

$\Delta x_1 = x_1(p_1', m) - x_1(p_1, m)$

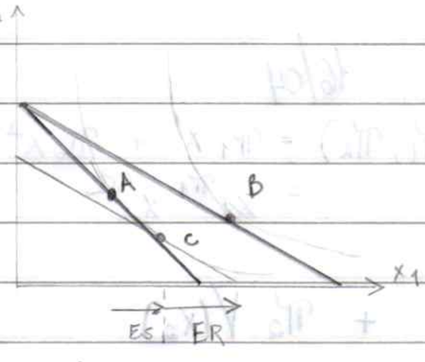
Bem normal → $\uparrow P_i$ ↓ Poder Aquisitivo $\downarrow X_i$
Bem inferior → $\uparrow P_i$ ↓ Poder Aquisitivo $\uparrow X_i$

	ET =	ES	+ ER	Sinais
$\uparrow P_i$	(−)	(−)	(−)	normal
$\uparrow P_i$	?	(−)	(+)	inferior → ER > ES, bem de Giffen

Tu vens, tu vens... eu já escuto os teus sinais.

Se $\uparrow X_i$ quando $\uparrow m$, $\downarrow X_i$ quando $\uparrow P_i$

ES de Hicks:



$\Delta P_1/P_2$ tal que $\bar{U}$
Função demanda compensada hicksiana

Ex: $U(x_1, x_2) = x_1^{0,5} x_2^{0,5}$ $P_1 = 1$ $P_2 = 2$ $m = 80$

$\frac{PMg_1}{PMg_2} = \frac{x_2}{x_1} = \frac{1}{2}$ $x_2 = \frac{x_1}{2}$ $x_1 + 2x_2 = 80$ $\bar{U} = 40^{1/2} 20^{1/2} = 20\sqrt{2}$

$x_1 = 40$ $x_2 = 20$ $x(1, 2, 80) = (40, 20)$

$P_1' = 0,5$ $\frac{x_2}{x_1} = \frac{0,5}{2}$ $x_2 = \frac{x_1}{4}$ $0,5x_1 + x_1/2 = 80$

$x_1 = 80$ $x_2 = 20$ $x_1'(0,5, 2, 80) = (80, 20)$

ET = 40 $x_1^{1/2} \left(\frac{x_1}{2}\right)^{1/2} = \frac{x_1}{2} = 20\sqrt{2}$

$x_1 = 40\sqrt{2}$ $x_2 = 10\sqrt{2}$