

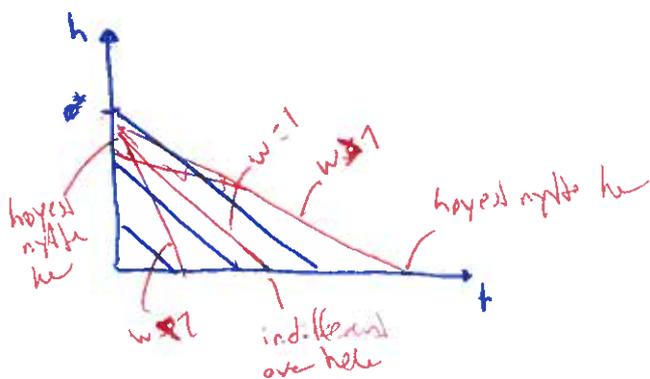
Oppgave 1

$U(c, r), r = t + h, c + t = nw$

a) $U(c, r) = U(c, t + h) \quad T = n + h \Rightarrow n = T - h \Rightarrow \frac{1}{w}c + \frac{1}{w}t + h = T$

$\Rightarrow \max\{U(c, t+h)\} \text{ gitt } \frac{1}{w}c + \frac{1}{w}t + h = T$

b) Har funnet optimal (c^*, r^*) . Hvordan skulle $r^* = t + h$ optimalt?



Indifferenskurve $h = r^* - t$

BB $h = T - \frac{1}{w}c - \frac{1}{w}t$

Se at $w < 1 \Rightarrow t = 0$ optimalt, $w > 1 \Rightarrow h = 0$ optimalt

c) Lønningene relatert til pris på hushjelp øker \Rightarrow Flere ønsker hushjelp fra modellen

d) To ulike forklaringsmekanismer, Davigs forklaring har ikke med lønnsnivå å gjøre direkte. Men kanskje jo høyere lønn, så begynner noen å bruke hushjelp, så mindre skattebetaling for andre osv. Kanne modellen "skammen" ved et nytte tap så å bruke hushjelp.

$U(c, t+h, \frac{t}{h})$
 \leftarrow "skammen"

Oppgave 2

1

a) $p_x x(p_x, p_y, I) + p_y y(p_x, p_y, I) = I$

$$p_x \frac{\partial x}{\partial I} + p_y \frac{\partial y}{\partial I} = 1$$

Anta $\frac{\partial x}{\partial I} < 0$ og $\frac{\partial y}{\partial I} < 0$ (begge minderverdige), da er LHS < 0 , ulovlig siden RHS = 1

⇒ Begge kan ikke være minderverdige

b) Prosentvis økning i varekostn per prosent økning i inntekt

c) $p_x \frac{\partial x}{\partial I} \frac{x}{I} + p_y \frac{\partial y}{\partial I} \frac{y}{I} = 1$ $\epsilon_{x,I} \frac{p_x x}{I} + \epsilon_{y,I} \frac{p_y y}{I} = 1$

d) Anta $\epsilon_{x,I} > 1$ og $\epsilon_{y,I} > 1$

⇒ $\epsilon_{x,I} \frac{p_x x}{I} + \epsilon_{y,I} \frac{p_y y}{I} > \frac{p_x x}{I} + \frac{p_y y}{I} = 1$, motstridelse.

Oppgave 3 4.8

a) $U(x, y) = \min(x, y)$ maks $\{\min(x, y)\}$ gitt $p_x x + p_y y = I$

⇒ maks $\left\{ \min\left(x, \frac{I - p_x x}{p_y}\right) \right\}$ Anta $x = y = \frac{I - p_x x}{p_y}$

⇒ $x(p_x + p_y) = I$ $x = \frac{p_x + p_y}{I}$ $y = \frac{p_x + p_y}{I}$

$U(p_x, p_y, I) = \min(\cdot, \cdot) = \frac{p_x + p_y}{I}$ indirekte nytte

Expenditure: min $p_x x + p_y y$ gitt $\min(x, y) = U$ ⇒ $x = y = U$

$E(p_x, p_y, U) = U(p_x + p_y)$

$$U(x, y) = x + y \quad \max \left\{ x + \frac{I}{P_x} - \frac{P_x x}{P_y} \right\} \Rightarrow \max \left\{ x \left(1 - \frac{P_x}{P_y} \right) \right\}$$

$$P_x > P_y \Rightarrow y = 0, \quad x = \frac{I}{P_x}, \quad P_x < P_y \Rightarrow x = 0, \quad y = \frac{I}{P_y}$$

$$x = \begin{cases} \frac{I}{P_x} & P_x \geq P_y \\ 0 & P_x < P_y \end{cases} \quad y = \begin{cases} 0 & P_y \geq P_x \\ \frac{I}{P_y} & P_y < P_x \end{cases}$$

~~$$U(P_x, P_y, I) = \frac{I}{P_x}$$~~

$$U(P_x, P_y, I) = \begin{cases} \frac{I}{P_x} & P_x \leq P_y \\ \frac{I}{P_y} & P_x > P_y \end{cases}$$

$$\min \{ P_x x + P_y y \} \text{ gitt } x + y = I \Rightarrow \min \{ P_x x + P_y (I - x) \} = \min \{ x(P_x - P_y) + I P_y \}$$

$$\Rightarrow E(P_x, P_y, I) = \begin{cases} I P_x & P_x \leq P_y \\ I P_y & P_x > P_y \end{cases}$$

b) Ved min vil man ønske $x=y$, for om $x > y$ eller $y > x$ bruker man unødigt mye på den sterkeste, ved lineær vil man kun bruke penger på billigste, på de veier kjed, og får mest av billigste.

Oppgave 3 5.1

a) $U\left(\frac{x}{0.75}, \frac{y}{2}\right)$

b) $\max \{ U\left(\frac{x}{0.75}, \frac{y}{2}\right) \} \text{ gitt } P_x x + P_y y = I \Rightarrow \max \left\{ U\left(\frac{x}{0.75}, \frac{I - P_x x}{2 P_y}\right) \right\}$

$$\frac{\partial U}{\partial x} \frac{1}{0.75} = \frac{\partial U}{\partial y} \frac{P_x}{2 P_y} \quad \frac{\partial U}{\partial x} \left(\frac{x}{0.75}, \frac{I - P_x x}{2 P_y} \right) = \frac{0.75}{2} \frac{P_x}{P_y}$$

$$\frac{\partial U}{\partial y} \left(\frac{x}{0.75}, \frac{I - P_x x}{2 P_y} \right) = \frac{0.75}{2} \frac{P_x}{P_y}$$

Løsning gir $x(P_x, P_y, I)$

c)

Oppgave 3 §.1

a) Kan uttrykkes ved lineær nyttefunksjon

$$U(x, y) = \frac{1}{0.75}x + \frac{1}{2}y = \underline{\underline{\frac{4}{3}x + \frac{1}{2}y}}$$

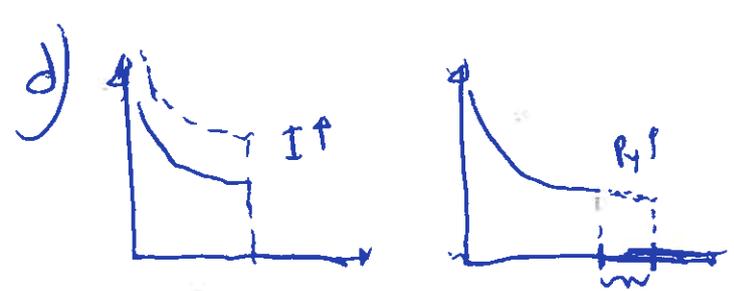
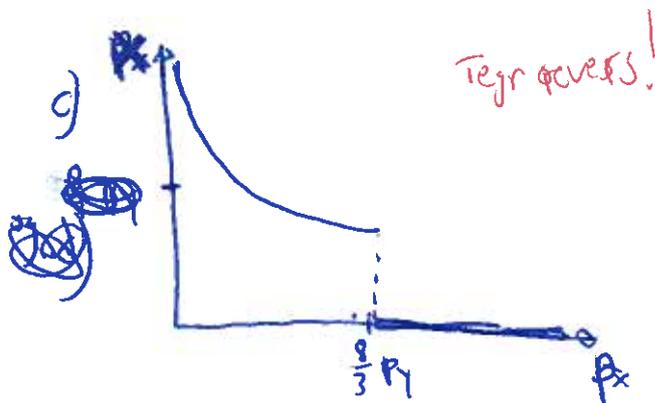
~~$x(p_x, p_y, I)$~~

b) $\max \left\{ \frac{4}{3}x + \frac{1}{2}y \right\}$ gitt $p_x x + p_y y = I$ $y = \frac{I - p_x x}{p_y}$

$$\max \left\{ \frac{4}{3}x + \frac{1}{2} \frac{I - p_x x}{p_y} \right\} = \max \left\{ x \left(\frac{4}{3} - \frac{1}{2} \frac{p_x}{p_y} \right) + \frac{I}{2p_y} \right\}$$

$$\frac{4}{3} > \frac{1}{2} \frac{p_x}{p_y} \quad p_x < \frac{8}{3} p_y$$

$$\Rightarrow x(p_x, p_y, I) = \begin{cases} \frac{I}{p_x} & \text{om } p_x \leq \frac{8}{3} p_y \\ 0 & \text{ellers} \end{cases}$$

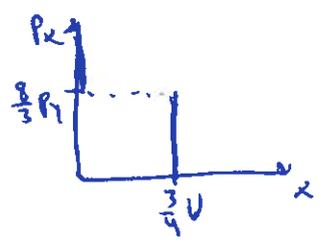


e) ~~$\frac{4}{3}x + \frac{1}{2}y = U$~~ $\frac{4}{3}x + \frac{1}{2}y = U$ $p_x x + p_y y = I$

~~$y = 2U - \frac{8}{3}x$ $p_x x + p_y (2U - \frac{8}{3}x) = I$ $I - \frac{8}{3}p_y x = I - p_x x$ $-\frac{8}{3}p_y x = -p_x x$ $\frac{8}{3}p_y x = p_x x$ $\frac{8}{3}p_y = p_x$ $p_x < \frac{8}{3}p_y$~~

$$\min \left\{ p_x x + p_y \left(2U - \frac{8}{3}x \right) \right\} = \min \left\{ x \left(p_x - \frac{8}{3}p_y \right) + p_y 2U \right\}$$

$$\Rightarrow x = \begin{cases} \frac{3}{4}U & \text{om } p_x < \frac{8}{3}p_y \\ 0 & \text{ellers} \end{cases}$$



~~konstant~~ konstant, med hopp til null

Oppgave 5 5.2



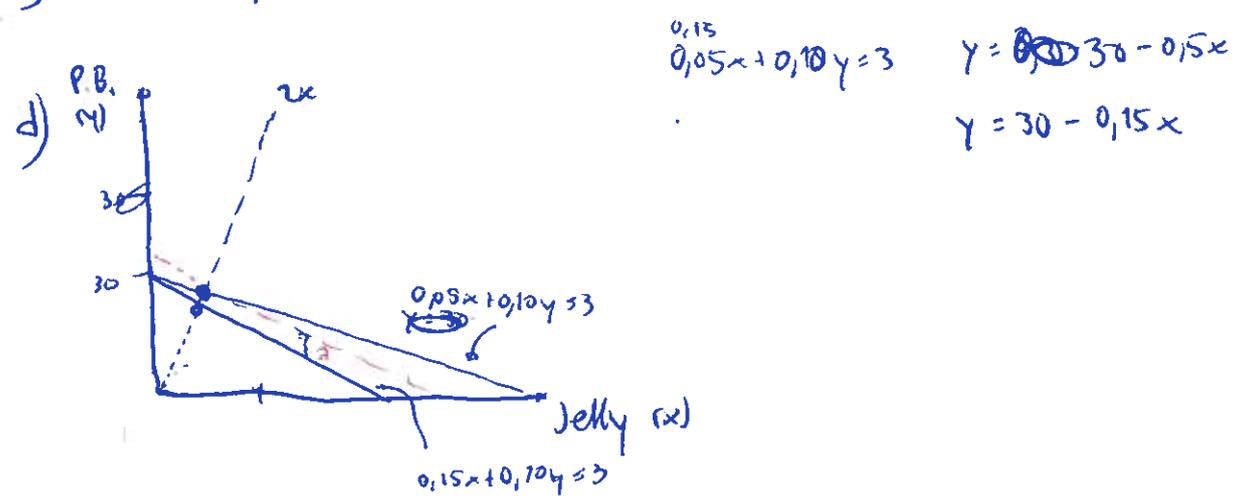
a) 1 Jelly, 2 peanut butter per bread.

La Jelly = x \Rightarrow $\frac{\text{peanut butter}}{y} = 2x$

$3 = 0,05x + 0,10(2x) = 0,25x \quad x = \frac{3}{0,25} = 12 \quad \underline{x=12} \quad \underline{y=24}$

b) $3 = 0,15x + 0,10(2x) = 0,35x \quad x = \frac{3 \cdot 20}{7} \quad x = \frac{60}{7} \approx 8,57 \quad \underline{y \approx 17,14}$

c) $3 + a = 0,15 \cdot 12 + 0,10 \cdot 24 = 4,2 \quad \underline{a = 1,2}$



e) ~~Kun~~ Siden $y=2x$, en-liten forhold. Kan si $\textcircled{10}$

$z = \text{"Pislegg"}$, der $z = x + y = 3x$ Pris $z = \underline{\underline{p_x + 2p_y}}$

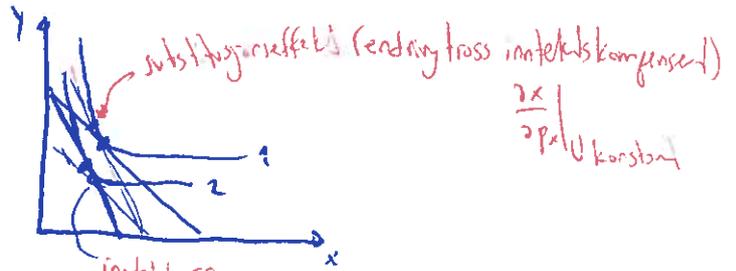
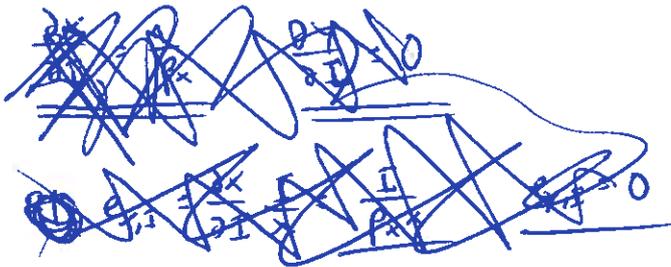
$\Rightarrow I = p_z z \quad \Rightarrow z = \frac{I}{p_x + 2p_y}$

f) Kun inntekts effekt, ingen substitusjonseffekt.

Oppgave 6 5.12

$U(x,y) = x + \ln y$ $P_x x + P_y y = I$ $x = \frac{I}{P_x} - \frac{P_y}{P_x} y$

a) $\max_y \left\{ \frac{I}{P_x} - \frac{P_y}{P_x} y + \ln y \right\}$ $\frac{1}{y} = \frac{P_y}{P_x}$ $y = \frac{P_x}{P_y}$ $x = \frac{I}{P_x} - 1$ $\Rightarrow U = \frac{I}{P_x} - 1 + \ln \frac{P_x}{P_y}$



~~min { P_x x + P_y y } gitt x + \ln y = U~~
 $x = U - \ln y$

$-\frac{dx}{dI} \frac{\partial E}{\partial P_x}$

$\min_y \{ P_x (U - \ln y) + P_y y \}$ $P_x = \frac{P_x}{y}$ $y = \frac{P_x}{P_y}$ $x = U - \ln \frac{P_x}{P_y}$ $E = P_x (U - \ln \frac{P_x}{P_y}) + P_y x$

Inntekts effekt: $-\frac{\partial x}{\partial I} \frac{\partial E}{\partial P_x} = -\frac{1}{P_x} \left[U - \ln \frac{P_x}{P_y} + P_y y + 1 \right] = 0$ $-\frac{\partial y}{\partial I} \frac{\partial E}{\partial P_y} = 0$

$\frac{\partial x}{\partial I} \frac{I}{x} = \frac{1}{P_x} \frac{I}{x} = \frac{1}{P_x x}$ $\frac{\partial y}{\partial I} \frac{I}{y} = 0$

b) $\frac{dx}{dP_x} |_{U \text{ konstant}} = \frac{d}{dP_x} \left(U - \ln \frac{P_x}{P_y} \right) = -\frac{1}{P_x}$ $\frac{dy}{dP_y} |_{U \text{ konstant}} = \frac{d}{dP_y} \left(\frac{P_x}{P_y} \right) = -\frac{P_x}{P_y^2}$

$\frac{dx}{dP_x} |_{U \text{ konstant}} \frac{P_x}{x} = -\frac{P_y}{x}$ $\frac{dy}{dP_y} |_{U \text{ konstant}} \frac{P_y}{y} = -\frac{P_x}{P_y}$

c) $\frac{\partial x}{\partial P_x} (P_x, P_y, I) = -\frac{1}{P_x^2}$ $\frac{\partial x}{\partial P_x} |_{U \text{ konstant}} - x \frac{\partial x}{\partial I} = -\frac{P_y}{P_x} - \frac{1}{P_x} \left[U - \ln \frac{P_x}{P_y} - P_y y + 1 \right] = -\frac{P_y}{P_x} - \frac{1}{P_x} \left[U - \ln \frac{P_x}{P_y} - P_y y + 1 \right]$

~~$-\frac{1}{P_x} \frac{I}{P_x} = -\frac{1}{P_x^2}$~~ ~~$\frac{P_y}{P_x} \times \frac{1}{P_x} = \frac{P_y}{P_x^2}$~~ $= -\frac{1}{P_x} \left[\frac{I}{P_x} \right] = -\frac{I}{P_x^2}$ Yes

$\frac{\partial y}{\partial P_y} (P_x, P_y, I) = -\frac{P_x}{P_y^2}$ $\frac{\partial y}{\partial P_y} |_{U \text{ konstant}} - \frac{\partial y}{\partial I} \frac{\partial E}{\partial P_y} = -\frac{P_x}{P_y^2}$ Yes

d) Når $\alpha = 1$ vil det skyldes at $\frac{\partial E}{\partial P_x} = x^c = x$ i nyttemaksimeringspunktet