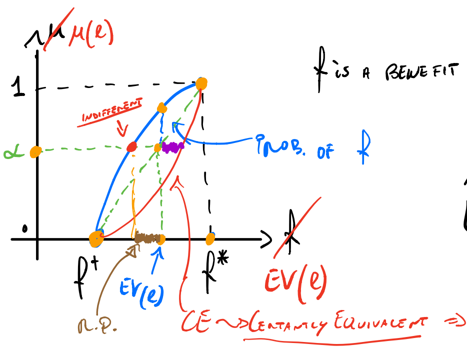
RISK PROFILE : $\mu(f)$



f is a BENEFIT

TRY TO ESTIMATE HIS UTILITY

$\Rightarrow u(f) = u(\ell)$

$$\mu(\ell) = \alpha$$

$$EV(\ell) = \alpha \cdot f^* + (1-\alpha) f^+ = \mu f^* + (1-\mu) f^+ = u(f^* - f^+) + f^+$$

$$u = \frac{EV - f^+}{f^* - f^+}$$

~> SAME GRAPH FOR DETERMINISTIC IMPACT

$$f = \alpha f^* + (1-\alpha) f^+$$

IF $u(\alpha f^* + (1-\alpha) f^+) > \alpha = \alpha u(f^*) + (1-\alpha) u(f^+)$

THEN THE DECISION MAKER IS RISK-AVERSE

$EV(\ell)$ IF $u(\alpha f^* + (1-\alpha) f^+) < \alpha$ THEN DECISION MAKER IS RISK-PRONE

$$\begin{cases} \max\limits_{x \in X} u(\ell(f(x,\omega), \pi(\omega))) \end{cases}$$

R.P. ~> RISK PREMIUM
IS A PREMIUM THAT WE WANT IN ORDER TO ACCEPT THE RISK

$$\text{RiskPremium} = RP(\ell) = EV(\ell) - CE(\ell)$$

---

last argument for DSS

DECISION TREE

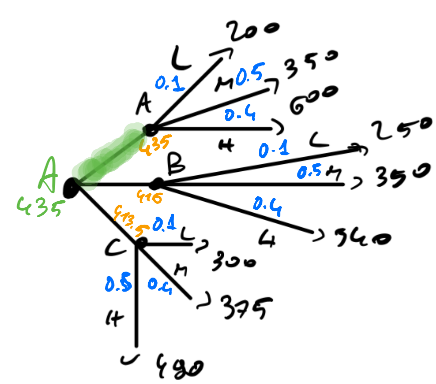
~> another tool

	Low	Medium	high	WC	LAPL	EV
A	200	350	600	200	383.3	$\boxed{435}$
B	250	350	540	250	380	416
C	300	375	430	$\boxed{300}$	$\boxed{388.3}$	413,5
$\pi(\omega)$	0.1	0.5	0.4			

← MARKET DEMAND

idea: 1° CHOSE THE MODEL

SOLVE THE PROBLEM IN THE TREE
↳ GO BACKWARDS FROM THE LEAVES TO THE ROOTS



→ APPLY A CRITERIUM → A DECISION

→ TAKE THE MAX VALUE AS BEST MODEL. → OPTIMIZING

→ I CAN ALSO PREPARE FOR THE WORST CASE ⇒ THE BEST IS 300 ⇒ SOLUTION C

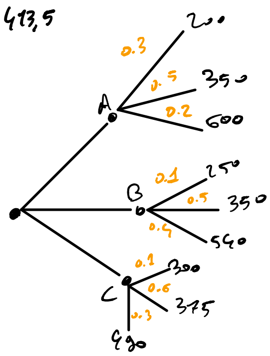
→ IS THE SAME THING BUT WITH A GRAPHICAL APPROACH

1) SCENARIO PROBABILITIES CONDITIONED BY THE DECISION

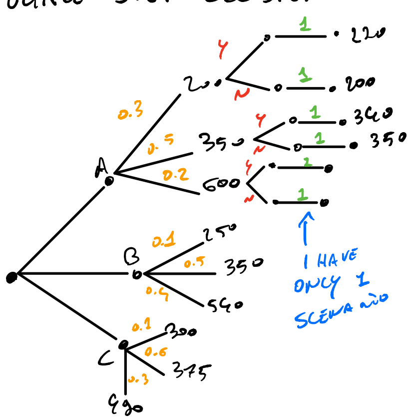
	Low	Medium	High	WC	LAPL	EV
A	200	350	600	200	$383.\overline{3}$	$\boxed{435}$
B	250	350	540	250	380	416
C	300	375	490	$\boxed{300}$	$\boxed{388.\overline{3}}$	413,5

$\pi_{(\omega)}$	0.1	0.5	0.4

$\pi(\omega \mid x)$			
A	0.3	0.5	0.2
B	0.1	0.5	0.4
C	0.1	0.6	0.3



2) MULTIPLE-STEP DECISIONS → has succeeded or not?



CHOICE YES OR NOT? ⇒ USE EXPECTED VALUE CRITERIA

STRATEGY
$$x^* = C$$
$$y^*_{(\omega)} = \begin{cases} Y & \text{if } \omega \in \{L, M\} \\ N & \text{if } \omega = H \end{cases}$$

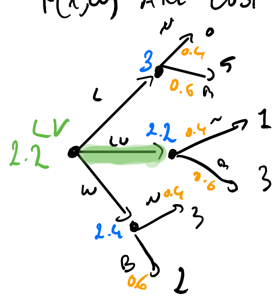
3) RANDOM EXPERIMENTS

$x \backslash \omega$	N	B
L	0	5
LU	1	3
W	3	2
π	0.40	0.60

⊛

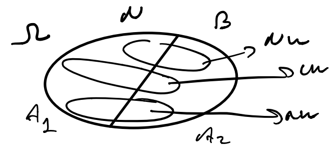
R with the weather

$R(x,\omega)$ ARE COST

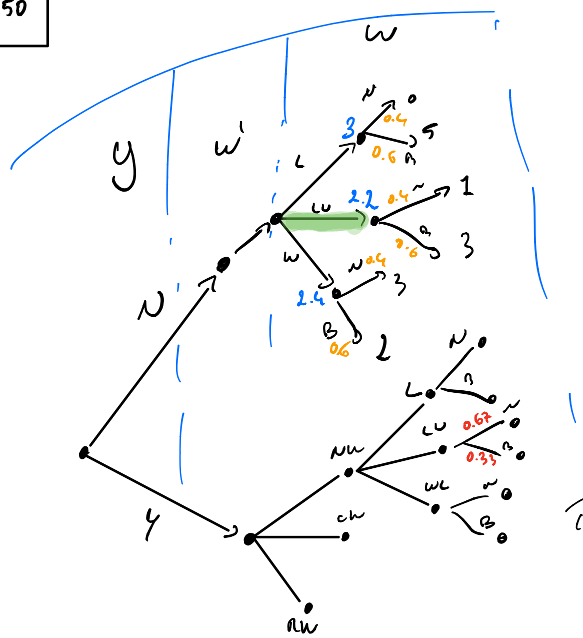


$\pi(w'\|w)$	N	B
NW	0.6	0.2
CW	0.25	0.3
RW	0.15	0.50

← BAROMETER



IF WE HAVE TO PAY FOR SEE THE BAROMETER IS NOT THE SAME



$\pi(w|w')$

BAYES

$$\mathbb{P}(A_1|NW) = \frac{\mathbb{P}(A_1 \cap NW)}{\mathbb{P}(NW)} = \frac{\mathbb{P}(NW|A_1)\,\mathbb{P}(A_1)}{\mathbb{P}(NW)} = \frac{\mathbb{P}(NW|A_1)\,\mathbb{P}(A_1)}{\mathbb{P}(NW \cap A_1) + \mathbb{P}(NW \cap A_2)}$$

$$\mathbb{P}(NW|A_1) = \frac{\mathbb{P}(NW \cap A_1)}{\mathbb{P}(A_1)}$$

$$\pi(w, w') = \frac{\pi(w'|w)\,\pi(w)}{\sum_{w \in \Omega} \pi(w'|w)\,\pi(w)}$$

$\pi(w \cap w')$	N	B	$\pi(w')$
NW	0.24	0.12	0.36
CW	0.10	0.18	0.28
RW	0.06	0.30	0.36
	SUM: 0.4	SUM: 0.6	

THE SIZE OF THE 3 EVENTS

$\pi(w\|w')$	N	B
NW	0.66	0.33
CW	0.36	0.64
RW	0.17	0.83

$0.12/0.36$

end