

## E: Efficient risk sharing, part 2

Review from last time:

Founder's options:

1. Current salary: \$100k
2. Startup with uncertain payoffs:

State	Probability	Payoff
Success (S):	20%	\$1M
Fail (F):	80%	\$10k

EV is \$208k

Risk averse founder:  $u(c_i) = c_i^{0.5}$

Risk neutral VC: only cares about EV

Contract:

1. VC pays founder \$30k if tries startup
2. VC takes 30% of payoff if startup succeeds

Outcome:

Founder: \$9k

VC: \$30k

Total: \$39k

Pareto improvement

Can do even better:

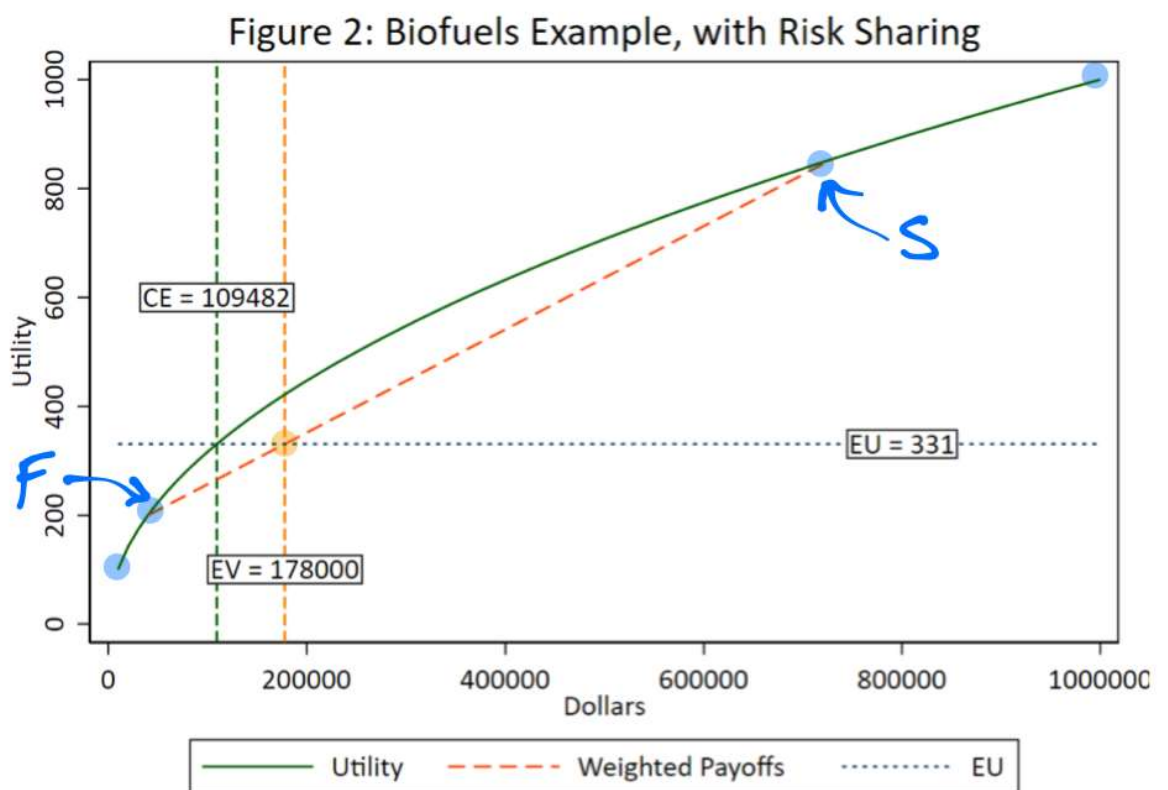
Potential gain:

EV of startup: \$208k

Salary: \$100k

Potential gain: \$108k

Why does contract only produce \$39k gain?



Gap between founder's EV and CE:

$$178k - 109k = 69k$$

Smaller than before: bearing less risk

Full accounting:

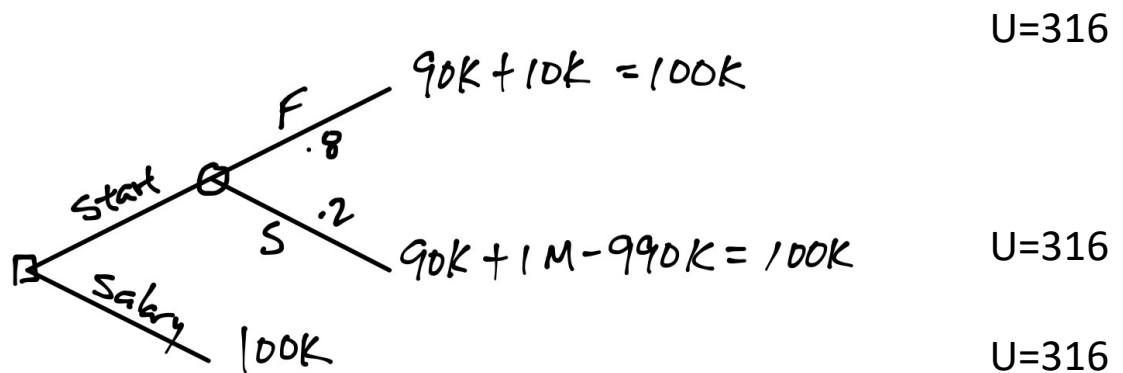
Contract gain: \$39k

Founder's risk bearing: \$69k  
 Total: \$108k

Alternate contract:

1. VC pays founder \$90k to try startup
2. VC receives 99% of payoff if succeeds

Founder's decision:



Founder's EV and EU:

$$EV = \$100k$$

$$EU = 316$$

Founder indifferent:

Full insurance

Satisfies participation constraint (barely)

VC's payoff:

$$EV = 0.8 * (-90,000) + 0.2 * (900,000) = 108,000$$

Overall gain:

Founder:	\$0
VC:	\$108k
Total:	\$108k

Implication:

Greatest efficiency if least risk averse agent bears risk

Potential downside:

Founder indifferent between S and F

Moral hazard problem if probabilities depend on effort