

# Discussion of S. Basak, D. Makarov, A. Shapiro, and M. Subrahmanyam “Security Design with Status Concerns”

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- Convertible securities are widely used to finance endeavors.
- Convertible securities arise as an optimal contract in the PA setting with agency frictions.
- Motivate convertible security as optimal for the agent with “status” preferences.
- Methodological - how to solve a security design problem when the agent has “weird” preferences.

- Continuous-time economy with full information and no agency problems.
- Two agents: **Entrepreneur** and **Financier**.
- Entrepreneur has a *unique* project requiring initial investment  $V_0$ .
- After initiation the value of the project follows controlled GMB

$$\frac{dV_t}{V_t} = \phi_t [\mu dt + \sigma dB_t]$$

- Entrepreneur controls  $\phi_t$  called by “novelty”.
- In spite of the explanation given in the paper I still have a Q: **Why are  $\mu$  and  $\sigma$  scaled similarly?**

- Entrepreneur:
  - Has empty pockets but strives for status

$$U_E(W) = \begin{cases} \frac{W^{1-\gamma_E}}{1-\gamma_E}, & W < L \\ \frac{(W-\alpha)^{1-\gamma_E}}{1-\gamma_E} + B, & W \geq L \end{cases}$$

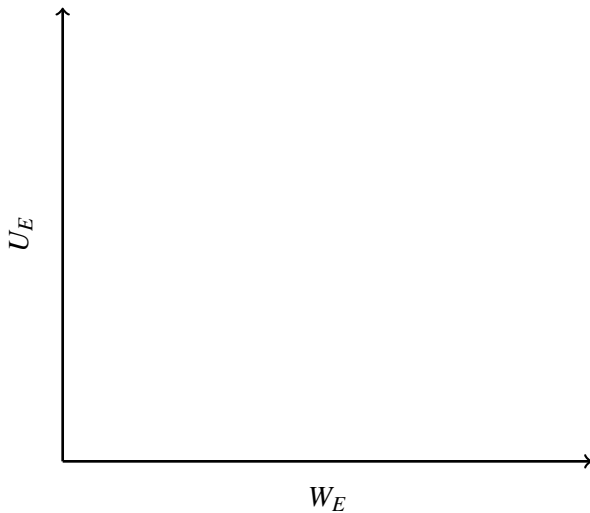
- Q: It seems to be isomorphic to the manager with empire building preferences.
- Risk-averse financier with deep pockets:

$$U_F(W) = \frac{W^{1-\gamma_F}}{1-\gamma_F}$$

- Financier has a reservation utility  $\bar{U}_F$ .

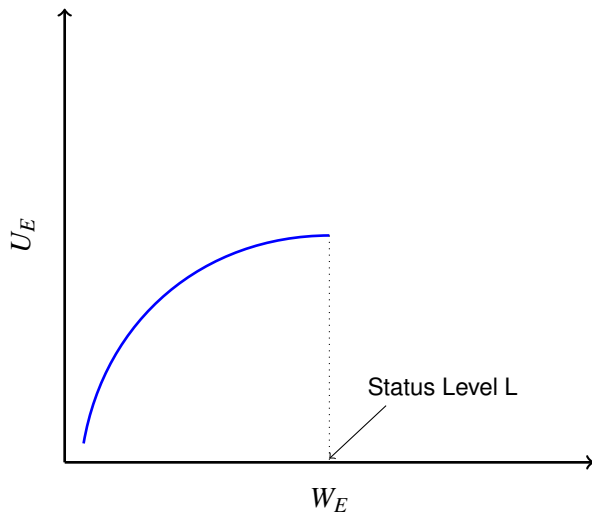
# Model

## Entrepreneur's "Status" Utility



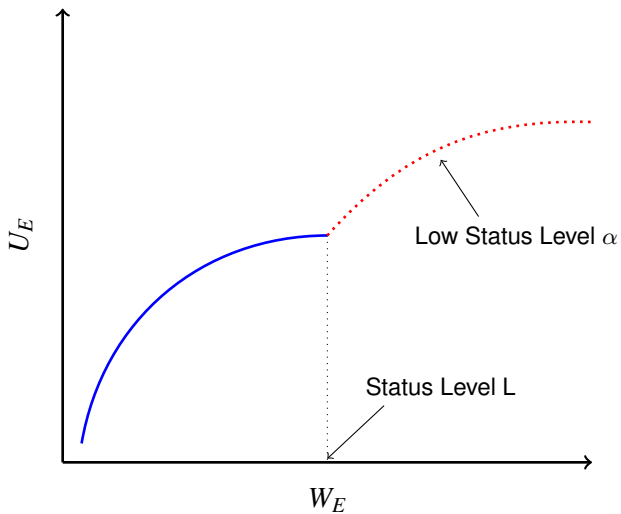
# Model

## Entrepreneur's "Status" Utility



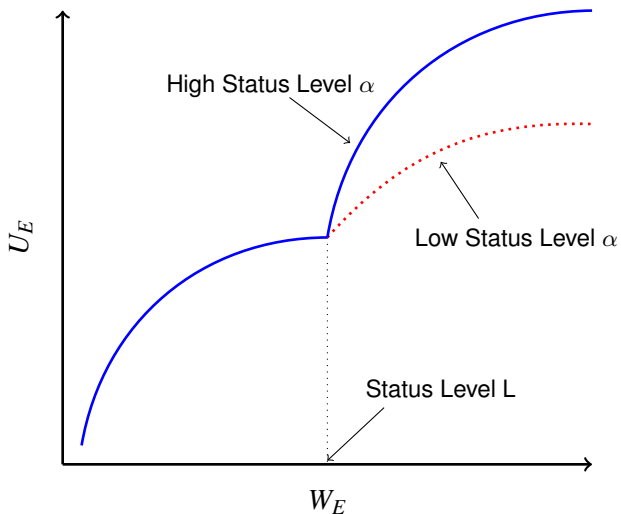
# Model

## Entrepreneur's "Status" Utility



# Model

## Entrepreneur's "Status" Utility





- Financier provides  $V_0$  and gets back the security worth  $W_{FT}(V_T)$ .
- Entrepreneur's horizon,  $\tau$ , is longer than that of the security,  $\tau < T$ .

## Self-Financing

Entrepreneur chooses  $\phi_t^* > 0$ ,  $t \in [0, \tau]$ , by solving

$$\begin{aligned} & \max_{\phi} E[U_E(V_\tau)] \\ & \text{subject to } dV_t = \phi_t V_t (\mu dt + \sigma d\omega_t). \end{aligned}$$

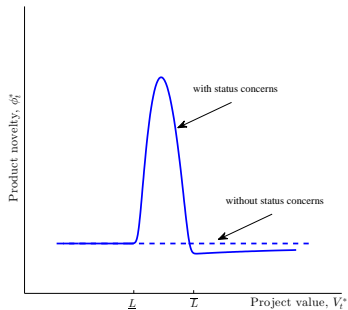
## Optimal Security

The optimal security,  $W_{FT}^*(V_T)$ , and the novelty process,  $\phi_t^* > 0$ , solve

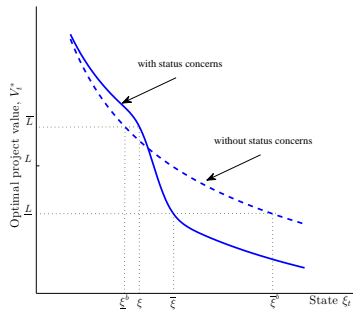
$$\begin{aligned} & \max_{\phi, W_{FT}} E[U_E(V_\tau)] \\ & \text{subject to } dV_t = \phi_t V_t (\mu dt + \sigma d\omega_t) - W_{FT} d\mathbf{1}_{\{t=T\}} \\ & E[U_F(W_{FT})] \geq \bar{U}_F. \end{aligned}$$

# Solution

## Self-Financing



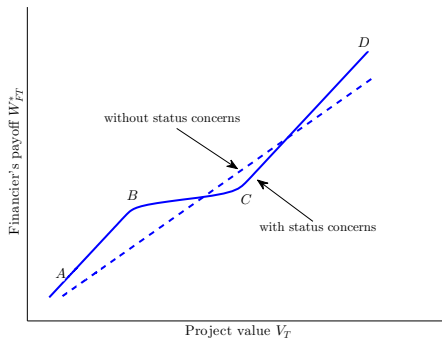
(a) Product novelty



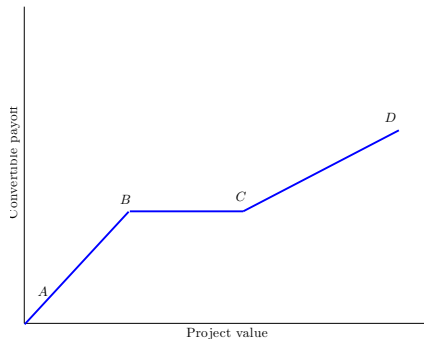
(b) Project value

# Solution

## Optimal Security



(a) Optimal security



(b) Payoff of an actual convertible security

- In the absence of status concerns equity allows for “perfect risk” sharing between E and F.
- The slope of the equity payoff depends on the relative risk aversion of the F and E.
- With the status concern there exists an interval of E’s wealth where she increases the volatility of the project.
- Equity is too risky for the F and she asks for a contract with a smallest possible slope - i.e. fixed payoff.
- Similar to the case of risk neutral P and A (Innes, 1990) who has limited liability where debt is optimal contract.
- Once E status is high his risk appetite goes back to the “low status” level and equity is optimal again.
- As long as “attached” parts of the E’s utility are symmetric the slopes of AB and CD are the same.

- I would like to see more discussion in the paper.
  - If a manager with the SCU is about to be hired the P should be concerned whether her wealth is in the middle status region.
  - It looks quite isomorphic to agency problem.
  - You may include a discussion on whether giving options as part of a compensation makes sense.
- How is your story different from the story where RA is time-varying?

THE END