

## Alternative Energy Industry Chain Modelling

Lecturer: Junan Zhu      jazhu@jsfund.cn

Student: Zhenyu Jin      jzy20@mails.tsinghua.edu.cn

## Micro-Model Building

- Consider the three-node supply chain for one industry, especially new-energy lottery industry.

$$\begin{aligned} \prod_{mid} &= p \cdot \min(D, K) - h(D - K)^+ + s(K - D)^+ - cK \\ \prod_{mid} &= \int_0^K [p(D) \cdot D + s(K - D)] \cdot f(D) dD + \int_K^\infty [p(K) \cdot K - h(D - K)] \cdot f(D) dD - cK \end{aligned}$$

- Let the first order of the former equation to 0, thus can obtain that,

$$\begin{aligned} \frac{\partial}{\partial K} \prod_{mid} &= [p(K) \cdot K - sK] f(K) + sF(K) + SK \cdot f(K) - p(K)K \cdot f(K) \\ &\quad + [p'(K) \cdot K + p(K)] \cdot \overline{F(K)} + hK \cdot f(K) + h\overline{F(K)} - hK \cdot f(K) - c \\ &= [p'(K) \cdot K + p(K)] \cdot \overline{F(K)} + h\overline{F(K)} + sF(K) - c \\ &= 0 \end{aligned}$$

- If the price function  $p(D)$  maintain stable when the product has rigid market demand, the equation can be simplified to:

$$\begin{aligned} p\overline{F(K)} + h\overline{F(K)} + sF(K) &= c \\ F_D(K) &= \frac{p + h - c}{p + h - s} \\ K &= F_D^{-1}\left(\frac{p + h - c}{p + h - s}\right) \end{aligned}$$