Profit Sharing: A Contracting Solution to Harness the Wisdom of the Crowd
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Alice and Bob (deep pocketed; identically risk averse) participate in funding a risky, scalable project
• independently decide how much money to give – based on optimal return–risk trade-off
Both investors use private information (containing idiosyncratic noises) to guide investment decisions
• neither has access to the other’s private information
Q: How should they divide up any payoff from their investment?

If Alice and Bob find it optimal to invest $200 and $100, respectively, under no profit sharing (i.e. common stock)

Suppose the project appreciates 10% next period
Under no profit sharing (i.e. common stock) Alice gets back $220

If 50-50 instead (investment unchanged) Alice gets back $215

Bob gets back more than $110
Alice often gets back more than $220

Actually, under 50-50 Alice and Bob often find it optimal to invest more

Theorem 1. When \( n \) investors each with risk-aversion \( \rho_i \) and receiving \( a_i \) of the profit, iff the pre-agreed profit ratio is proportional to risk tolerance, i.e. \( a_i = \frac{1}{\sum_{i=1}^{n} 1/\rho_i} \), a Nash equilibrium exists, under which each investor’s payoff equals to that as if they can all freely communicate.

Implications: security design for investment crowdfunding, ICO/DAO, structuring of VC/PE partnerships