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

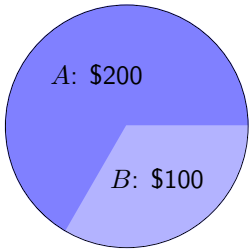
- independently decide how much money to give – based on optimal return–risk trade-off

Both investors use private information (containing idiosyncratic noises) to guide investment decisions

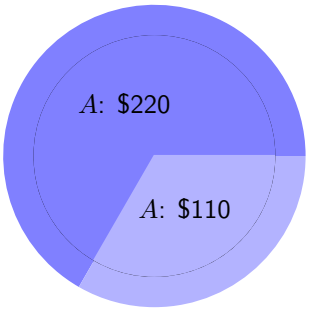
- neither has access to the other's private information

Q: How should they divide up any payoff from their investment?

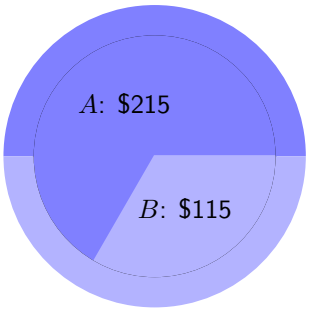
If Alice and Bob find it optimal to invest \$200 and \$100, respectively, under no profit sharing (i.e. common stock)



Suppose the project appreciates 10% next period

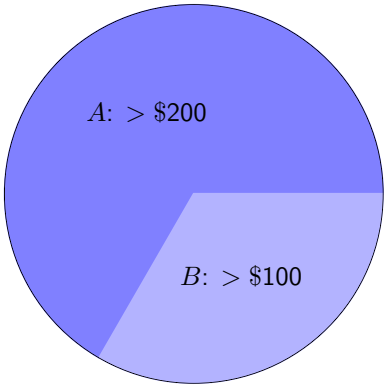


Under no profit sharing (i.e. common stock) Alice gets back \$220

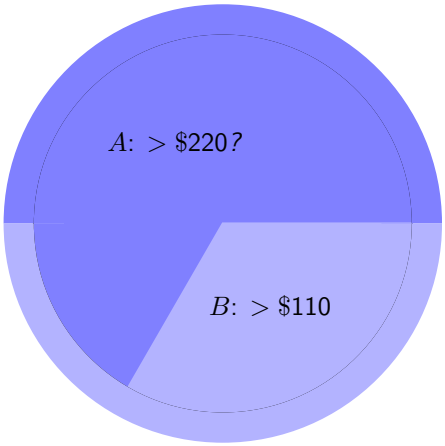


If 50-50 instead (investment unchanged) Alice gets back \$215

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



Still suppose 10% appreciation



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

Theorem 1. *When n investors each with risk-aversion ρ_i and receiving a_i of the profit, iff the pre-agreed profit ratio is proportional to risk tolerance, i.e. $a_i = \frac{1/\rho_i}{\sum_{i=1}^{n} 1/\rho_i}$, 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