LECTURE 10.3

OPTIMAL RISK SHARING

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Consider two risk averse individuals. Suppose they each face a risky but independent payment/ income stream.

$$\alpha = 0.5 = probability\ of\ receiving\ \$10{,}000$$

$$(1-\alpha) = 0.5 = probability\ of\ receiving\ \$0$$

Now consider the probabilities and payoffs if the parties agree to split the payoff:

$$\$0\ with\ probability\ of\ 0.25$$

$$\$5000\ with\ probability\ of\ 0.5$$

$$\$10000\ with\ probability\ of\ 0.25$$

In both cases the expected payoff is equal to $5,000.

OPTIMAL RISK SHARING

Even though the expected payoff is equal to $5,000 in both cases, if the individuals are risk averse they are better off under the latter arrangement.

For one, the probability of receiving a low payment (i.e. a payment of zero) is halved.

Moreover the variability of the payoffs are reduced:

$$\sigma = \$3535$$
$$\sigma = \$5000$$

We know that individuals generally avoid risky outcomes: e.g. insurance, buying into mutual finds or share portfolios.

Moreover, there is an opportunity for a Pareto improving trade if those who are more risk tolerant can pay purchase the risky income stream for a fixed amount. Then the risk averse individual is better off (by being paid their certainty equivalent) and the risk lover is also better off by being compensated for taking on additional risk.

For example, one individual (the risk neutral one) could purchase the risky income stream (with expected value of $5000) for $4500. If the certainty equivalent for the risk averse person is <$4500, both parties are better off.

EFFECTIVE INCENTIVE CONTRACTS

What will an effective incentive contract do? At least two things:

- Provide incentives: that is it will motivate employees to put in greater effort. Pay should be related to performance.
- Share risk efficiently: This may require that employees are paid a fixed salary, or more likely that they will be compensated appropriately for the risk that they assume.

Clearly there is a tradeoff in achieving these two aims. When incentives are greater, so too will be the level of risk the employee is exposed to. Or in other words, by insuring the employee against risk, the incentive to perform is reduced

Essentially we have a moral hazard problem – when the employer 'insures' the employee against risk the incentive to perform is reduced.