Dynamics of Risky Agreements

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Abstract

We investigate efficiency properties of agreements with the following features: (i) *self-enforcing*—any agent can walk away from the agreement at any moment; (ii) *dynamic*—payouts occur stochastically while the agreement is in force; (iii) *risky*—one agent is more favored by the agreement but the favored agent is unknown ex-ante. These features appear in international economic agreements, entrepreneurial ventures, and research partnerships. Such arrangements have formal or informal mechanisms to resolve disputes that may be more favorable to one agent, but who is favored is learned only as disputes arise. For example, over time the United States perceived they were unfairly treated in dispute rulings at the World Trade Organization (WTO), hence disabled the system they helped create. To model risky agreements we assume each agent has access to a (risky) Poisson bandit arm. An agent's risky arm is either good—with a high payout rate, or bad—with a low payout rate, but the type of arm is unknown to both agents. Only one agent has a good arm, so the arms are negatively correlated, and good news is not conclusive. We interpret having the good risky arm as being favored by the agreement. The agreement is in force if both agents are pulling their respective risky arms, and an agent can quit any time. If one agent quits, then the agreement is dead and both agents receive the safe payoff. Agents will enter the agreement if sufficiently optimistic that they are favored, and will exit when sufficiently convinced they are not favored. We show that the duration of such agreements is generically inefficient—can last too long, or end too quickly. Increasing "vagueness" reduces the speed of learning and extends agreement duration. This implies that precedent can lead agreements to end sooner than they may have otherwise, because it creates too much certainty in the distribution of future rewards.