

Consider the following two scenarios:

- Aaron, Abraham ... Zwingli (1000 people total) all have free time which they could use to help build a building for a local megacorp, CoordiCorp, which needs to be finished within one month. They value their free time at \$1000 per month, the building takes 500 man-months to build, and provides CoordiCorp with \$1 million of value.
- Aaron, Abraham ... Zwingli (1000 people total) all have free time which they could use to help renovate a park. They value their free time at \$1000 per month, the park takes 500 man-months to renovate, and provides each of the 1000 people with \$1000 of value.

In both cases, a coalition of at least 500 people is required to achieve a positive result. However, in the first case, there is an easy solution to align incentives: CoordiCorp pays each of 500 people \$1500 to work for a month, so each worker gets a net utility gain of \$500, the company gains \$1m value from the building at \$750k cost, and everyone is happy. When such a solution is undesirable, we call it bribery, but here the possibility of “bribing” workers to work leads to a very good result. In the second case, however, there is not an easy solution, and the best argument I can think of for why is that in the second case there is no concentrated beneficiary

that can make the side payments.

An “ideal dictator god” can clearly force everyone to work for 0.5 months (or, if months are indivisible, force 500 people to work for a full month and force the other 500 to pay them \$500 each) and achieve an outcome better for everyone than the uncoordinated market, and a hypothetical charity CoordiOrg can pay 500 people \$1500 to work for a month, but there’s no direct market incentive for such an organization to exist. Hence, there’s no easy way otherwise for the coalition to naturally emerge.

On the one hand, this is simply private goods vs public goods, and we all know that public goods are harder to incentivize. On the other hand, this thought experiment shows that required coalition size by itself is not a sufficient measurement of difficulty of coordination

. A mechanism that is secure unless the 500 people coordinate in case A is not very secure, a mechanism that is secure unless the 500 people coordinate in case B is much more secure. There are rather two levels of “ability to coordinate”, the first level being the ability of a group of agents to coordinate by accepting side payments from a given agent, and the second level being the ability of a group of agents to coordinate by actually acting as one agent with a shared set of interests.

The scary thing about public goods incentivization techniques involving subsidies is that they sit on a knife edge of coordination assumptions: they are only needed if agents cannot cooperate in the second (more difficult) sense, but they can fall victim to manipulation if agents can cooperate even in the first (easier) sense, as if the first sense of coordination is possible a fake public goods provider could extract subsidies by bribing many people to pretend that they are a legitimate public goods provider.

Question for game theory experts: does this distinction between types of coordination have a formal name in the literature? Has it been studied? Are there existing results that are relevant to making mechanisms robust against adversaries that have stronger coordination abilities?