Abstract

I'll recall the strengths and weaknesses of 3 different group decisionmaking protocols: voting, auctions, and futarchy. I'll describe a hybrid auction-prediction mechanism and call for more ideas!

Background

Governance decisions require aggregating two kinds of objects:

- preferences

- information

These are orthogonal. I might personally prefer that my town builds a library instead of a park. But I might predict better outcomes for my town as a whole in the case of the park.

Traditional voting schemes are designed to aggregate preferences, not information. (I'd presumably vote for the library). But even for pure preference aggregation, auctions can sometimes be better than voting. Voting is not incentive compatible, can be manipulated, doesn't reflect strength of preference, etc.

Instead, we could for instance auction off lottery tickets for the right to decide between a library and a park. People can express the strength of their preference by buying more tickets. (The revenue can be redistributed equally.)

But neither auctions nor voting take into account information aggregation.

Futarchy attempts to remedy this via "vote values, bet beliefs":

1. Vote on which metrics are important to society.

2. Use prediction markets to determine which decision optimizes those metrics, and take it.

Some drawbacks of futarchy

From what I've seen on ethresearch, proposals for DAO futarchy often skip the "vote values" stage entirely and assume the metric is the price of the DAO's token. But as I understand it, this severely limits the kinds of decisions that futarchy can make. For example, it seems hard for the DAO to decide via futarchy to allocate resources toward charity or something non-profitable.

To make other kinds of decisions, we need to include the "vote values" stage of futarchy. This likely inherits the drawbacks of standard voting schemes. And it relies on existence of some objective metrics for us to choose from. Something like "total welfare of members of the DAO" is very hard to measure objectively. So using futarchy to optimize it seems futile.

Proposal: mechanisms mixing auctions and prediction

On the other hand, auctions can be good for optimizing things like total welfare of a group. (And one can redistribute the revenue, etc.) So how about governance mechanisms that combine auctions and prediction?

I have one. It's based on Vickrey-Clarke-Groves (VCG) and inherits its drawbacks. It also uses proper scoring rules. We published it in a paper in 2013 for a very different context, but I also have a blog post about it.[1]

I'll explain by example. Each participant submits 3 numbers:

- $v_a =$

their value for "accept the proposal"

- $y_a =$

their forecast for the value of the token if we accept

- $y_d =$

their forecast for the value of the token if we deny

Interpret v_a

as the amount they'd be willing to pay to switch the decision from deny to accept. v_a

could be negative.

Decision rule.

Now let V

be the average of everyone's v_a

submissions. Let Y_a

be the average of everyone's y_a

submissions and similarly for Y_d

.

- If $V + Y\_a^2 > Y\_b^2$

, we accept the proposal.

- Otherwise, we deny the proposal.

Notice this objective is a compromise between futarchy (accept iff $Y\_A > Y\_b$

) and auctions (accept iff $V > 0$

).

Payment rule.

Now we have to decide how much everyone pays. It's a bit complicated, but the idea is that we can use proper scoring rules and the VCG mechanism so that people are incentivized to report all three numbers truthfully. I'll leave the details to the blog post / paper. But the idea of VCG is that if your bid "flipped" the outcome, then you pay an amount equal to the externality you impose (i.e. how much worse off everyone else is thanks to your bid flipping the outcome). And the idea of the scoring rule is that if we accept the proposal, you'll pay based on $(y\_a - Y^*)^2$

, where Y^*

is the actual price of the DAO token at a given future point in time, like a week after the vote. I.e. the squared loss of your prediction. If we reject then you'll pay based on $(y\_d - Y^*)^2$

.

Extensions.

We can replace Y^2

with any other convex function. We can also multiply it by a constant, which changes the relative importance of preferences vs predictions. The only issue with scaling up the prediction importance is that every participant is potentially on the hook to pay a lot of money if their predictions are wrong.

Questions

The really cool aspect is that the above proposal is in theory incentive-compatible, which neither voting nor futarchy is. The idea is if you want one outcome a lot more than the other, then your best way to achieve it is simply to bid your true value v_a

. Manipulating your predictions on top of that only hurts you.

But a big drawback of this particular scheme is that the aggregation of information is pretty weak. We just average everybody's forecasts. One would expect a prediction market to do a much better job.

Is there a simpler or better way to make governance decisions based on auctions and individual predictions?

Can we do governance combining auctions with prediction markets

? Auctions with futarchy?

Do auctions have a legitimate role in governance decisions?

The argument I know for the last one is this: either (a) you think everyone has enough money relative to the importance of these decisions (i.e. you believe economists' quasilinear assumption), in which case clearly auctions are the best since they maximize welfare. Or (b) you don't. In that case you probably agree that people with more money and power are able to use it to influence governance decisions, via direct or indirect manipulation. So why not just let rich people directly pay for the

governance decisions they want (since they do that anyway indirectly), and redistribute that money to everyone else, in hopes of at least working toward a more egalitarian future? Okay, tongue mostly in cheek.

[1] [The Tiger's Stripes](#)