Abstract:

Market making involves two things: paying for information, and providing liquidity to uninformed traders. Uninformed traders are comprised of routine flow (when the asset has utility) and gamblers. Neither of these are apply to “serious” prediction markets, e.g. for policy. Hence, it is unlikely that prediction market makers will have their information generation significantly subsidized by trading noise. However, many kinds of information are public goods, so there is a case for subsidizing the market with public and/or philanthropic funds. When is this counterfactually efficient

? We attempt to answer this question in terms of counterfactual revelation

.

Example Settings

We consider the following settings.

1. A sports game or an election proceeds. At several points in time, the public simultaneously receives information. Eventually, the market pays out.
2. The effects of a policy are betted on, the market opens well after the public has had the chance to discuss & grok the effects, and closes well before any data is actually available.
3. Someone has private information about a group/organization, and a market is formed to encourage the leaking of this information (this could be societally beneficial or harmful).

The cost/benefit of a bid/offer

WLOG we can analyze the market maker as placing a single bid and offer. Suppose we quote .40/.60 with $100 units on either side. Then we are offering a bounty of up to $40 for an opinion. The opinion is not fully informative, nor is the $40 loss guaranteed. However, we should assume the worst case, i.e. we pay the maximum loss to learn the minimum information.

As noted in Othman et al (2013), if both orders get filled, we’ve now made money and both:

- have a larger budget to pay for information
- have more dissent and hence perhaps a higher want for information
- have more likelihood of future dissent which compensates us financially

thus we should put out two larger orders; and as a corollory, if we get filled on e.g. the bid, then we should put out another offer (a bounty for taking the other side - e.g. correcting misinformation).

Is $40 the right price? If the choice were between publishing the information now, and never publishing the information, then this would be an easy decision. However, the choice may often be between publishing the information now versus publishing it a day or even a second later.

The opportunity cost of a bid/offer

The problem is overpaying for information when we could pay less. An intuitive solution would be to conduct “price discovery” via e.g. a reverse Dutch auction (per price band, e.g. one at 0.60, one at 0.70, etc) on the number of units offered to the market, with a reserve price indicating the societal value of the information.

As a toy model (i.e. all of the following is pseudomath only), we assume each counterparty i

is endowed with b_i

bits of information, has a cost of information production c_i(t, b)

to produce b

bits of information at time t

, and a disincentive p_i(b)

to release b

bits of information. We should not expect a fill if we are offering less than p_i(b) + c_i(t, b - b_i)

for all i

. This quantity may sharply decline over time (i.e. liquidity becomes stale) - in these cases, a reverse Dutch auction will still overpay. The quantity will also be cheap when b_i

is high for some i

, and in general there is most “bang for buck” when variance in b_i, c_i

are high (information asymmetry).

Conclusion

Most of the prediction markets live today are probably unproductive. Many proposed use-cases (futarchy, whistleblowing) may be viable but will require the subsidization to be efficient. Public goods funds may use Dutch auctions to sink an optimal amount of money into protocol-owned liquidity (POL), but should take care not to have the market open during times of free/cheap information diffusion.

Questions

What should the liquidity be at time t

if we have a “reserve price” of P

? Should we roll Othman et al (2013) and just increase the liquidity parameter b

over time? Should we instead choose a different shape for the liquidity curve? Can we gather evidence for the ideal shape from the size traders are trading? Should the shape itself evolve over time? Should the liquidity parameter (partially) reset upon a trade?