

# We Can't Argue Forever - But We Should Do So As Long As Possible

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We explore a model of costly dynamic deliberation in which two partially informed jurors with common interests try to arrive at a common binary verdict by coarse binary communication. They can only communicate their information through a dynamic deliberation process which terminates when one juror gives in to her opponent, i.e. argues/votes for the same verdict as her. This dynamic feature goes beyond standard models in the voting literature by allowing jurors to communicate and learn before casting their final vote. However, equilibrium communication is not perfect because of a trade-off between efficient (i.e. fast) and effective (i.e. precise) communication.

We prove that all equilibria are represented in cut-off strategies where jurors with weak information give in earlier and jurors with strong information hold out longer. Equilibria are of two kinds. In a "communicative" equilibrium any type of either juror will give in eventually, interpreting the persistence of her opponent as strong evidence for the verdict that the opponent is arguing for. In an "insistent" equilibrium communication breaks down at some point. All remaining types of one juror will insist on their opinion forever and all the remaining types of the other juror give in immediately. Most of the analysis focuses on the communicative equilibria because they Pareto dominate insistent equilibria (justifying the second part of the paper's title) and satisfy forward induction.

We then take a closer look at the size of communication costs and the judicial error, a measure indicating how unfavorable the available information is for the chosen verdict. We find that both may be unbounded even in an efficient equilibrium. More specifically, we show 1) that every communicative equilibrium must allow for non-terminal communication when the jurors' information strength is unbounded, and 2) that the realized judicial error is unbounded when the information distribution is unbounded and has sufficiently fat tails.

Next we consider asymptotic properties of efficient equilibria as the cost of communication, measured by the time per round  $\kappa$ , vanishes. While it is clear that total costs will decrease this is less clear for communication costs as a decrease in  $\kappa$  will be counteracted by an endogenous increase in the expected number of rounds of communication. In our main result we show that total costs are linear in  $\kappa^{\frac{2}{3}}$ . Thus both communication costs and the decision costs

from taking the wrong verdict vanish in  $\kappa$  (justifying the first part of the paper's title), albeit at a slower rate than  $\kappa$ . Moreover, we are able to show that the ratio of communication costs to decision costs converges to 2 for small  $\kappa$ .

The asymptotic analysis crucially relies on the assumption of common interests. Common interests ensure that a planner's solution for the optimal communication protocol is also an equilibrium. This reduces the analysis of the efficient equilibrium to an operations research question.