# Introducing the Roman Senatorial Debate

## James Bong

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Speech was bestowed upon man to disguise his thoughts.  —Tiberius (as quoted by Tacitus, Annals VI.6)	In the Senate, men do not speak the truth. They speak to win.  —(Paraphrase of sentiments found throughout Sallust and Cicero)
The Senate is a council of kings. —Ennius (quoted by Cicero)	Let arms yield to the toga, the laurel of the triumph to the tongue of the orator.  —Cicero, Pro Milone
Senators are not ashamed to praise whom they must, nor to attack whom they dare.  —Tacitus, Annals I.74	The more corrupt the state, the more numerous the laws.  —Tacitus (Ab excessu divi Augusti)

The parliament passes some acts or decree which may have the most devastating consequences, yet nobody bears the responsibility for it. Nobody can be called to account. For surely one cannot say that a Cabinet discharges its responsibility when it retires after having brought about a catastrophe. Or can we say that the responsibility is fully discharged when a new coalition is formed or parliament dissolved? Can the principle of responsibility mean anything else than the responsibility of a definite person?

—Adolf Hitler, Mein Kampf

Parliament can do anything but make a man a woman and a woman a man.

—Sir Edward Coke (attributed)

The British Constitution has always been puzzling and paradoxical. It is an unwritten constitution, and yet it is written all over the place.

—E.M. Forster

The British Parliament is like a curious old clock: its hands move, but no one quite knows why.

—Aneurin Bevan (paraphrased)

The House of Commons is the longest running farce in the West End

 Clement Attlee (allegedly said in frustration during debates) Parliament is a talking shop.

—Common saying, derisive or admiring depending on tone

It is the duty of the opposition to oppose.

—Stanley Baldwin

In the Parliament of a free nation, all men are entitled to speak, and all others are entitled not to listen.

—Attributed to Lord Melbourne

Congress is so strange. A man gets up to speak and says nothing. Nobody listens—and then everybody disagrees.

—Boris Marshalov (often misattributed to Will Rogers) In America, anybody can be president. That's one of the risks you take.

—Adlai Stevenson

With few exceptions, democracy has not brought good government to new developing countries. What it has done is to disrupt authority and to make it difficult for governments to take decisive action.

—Lee Kuan Yew, The Wit and Wisdom of Lee Kuan Yew I do not believe that democracy necessarily leads to development. I believe what a country needs to develop is discipline more than democracy.

—Lee Kuan Yew, Interview with Fareed Zakaria, Foreign Affairs,

I'm not intellectually convinced that one-man-one-vote is the best. We practice it because that's what the British bequeathed us and we haven't really found a need to challenge that. But we have tweaked the system to prevent it from producing a third-world parliament.

—Lee Kuan Yew, The Man and His Ideas (interview collection) If all you have is one man, one vote, then the numerically largest group is going to dominate the rest, and in a multi-racial society, that's the recipe for disaster.

—Lee Kuan Yew, Quoted in Lee Kuan Yew: Hard Truths to Keep Singapore Going (2011)

## Introduction

I grew up and was trained in the British Parliamentary style in my intellectual youth. It might perhaps be rather unbecoming, embarassing, to still talk about one's "debating days". The person smells as if he has plateaued in the debating arena, and he's hankering to his glorious past at the expense of his interlocuter's patience. But the British Parliamentary style was incredibly influential to me, on my mode of internal dialectic, my rhetoric style, and substantive philosophical commitments. It was particularly impactful because prior to the British Parliamentary style, none of the various formats of debate I was acquainted with offered a comparable degree of intellectual challenge, game complexity, or

even just speech time for one to really make an oeuvre out of the motion. I was also convinced that the British Parliamentary style itself could serve as truthseeking, soothsaying machine. I was convinced that was a successful gameified implementation of the socratic dialectic method. The fact it was culturally contiguous with its namesake and inspiration the British Parliament, and that it shares nontrivial similarities in both operation and evolutionary tendencies (as I observed them when I was a competitive debater), made this position very attractive. The historical and cultural weight of the style, and the respect accorded by the venues in which debates of this style were often held, automatically lends legitimacy to one's speech, and therefore, a sense of responsibility - the British Parliamentary style was the style in which Oxford debated the motion "This House Would fight for King and Country", a debate that Hitler listened to on the radio and a debate that he frequently cited in his military decisions concerning Britain. The demands and standards of dynamism, quickwittedness, and argumentative flare, sanctioned by the rambunctious institution known as the point of information, was entirely alien to the repetoire of Sinitic intellectual discourse methodologies. I was even convinced that a backward, intellectually inferior, vocabularily and logically impoverished language, through the British Parliamentary style, could be beaten like glass - and acquire what the latent and subterrenean instruments of thinking that the English speaker have taken for granted - what I call "English Rationality". In my eyes, other debate styles such as AP, and WSDC, where mere inferior and watered-down variants of the British Parliamentary style.

I don't agree with this anymore. Or rather, I think the British Parliamentary style can still deliver these promises, to young impressionable individuals, and the style's impact is particularly potent to those who are intellectually honest, even if immature. However, a society quickly approaches the limits of the British Parliamentary style if they are not intellectually honest - if they don't check the stuff coming out of their mouths against God - and most people today don't do this, ever in their lives. They never ask "what if I am wrong?" - and God is there to give the final answer. They never test their propositions twice in their head. There are many other conditions that can beget degenerate intellectual group behaviour, and therefore push against the limits of the British Parliamentary style - but regardless of what they are, once a debating community reaches the limits of the British Parliamentary style, it starts to emit harmful intellectual radiation, and it gradually irradiates its debaters, its debating community, and even the politics of the state. In its most mature form, and in the most celebrated events where idols are made, the British Parliamentary style has become a farce.

It has become necessary for one to enumerate and declare the problems and ills that the British Parliamentary style manifests before us, the mechanisms and design flaws responsible for them, and the higher order downstream impacts on the intellectual developments of participants and wider society.

- The Dictatorship of the Adjudicator Class which is a bug that makes the entire game, and its outgrowth ecosystem (debate teams, clubs, debate tutorial schools, national training squads and teams) extremely prone to intellectual capture.
- Equity which basically prevents hate speech. To those who see value in Cicero's deployment of as hominem attacks as effective highlights of praxological inconsistencies, this custom is highly regrettable. The entire

custom abstracts the debate away from reality, breaks the connection between the speaker and his speech, notwithstanding the fact that reality is a place populated by instances of fierce burning hatred and irreconcilable differences.

- Stakelessness the nonexistent bumps against the decrepit The game does not have a proxy for a real actual stake that often pushes people into politics, like money or power. People debate because there's politics. There's politics because as a solution to conflict, it's cheaper than violence. There is conflict because people have opposing stakes and interests. Debates abstracts all of that away into just intellectualism, without stakes or interests. At best only the speaker's reputation is at stake.
- **Persuasion** There is no real room or need for persuasion. The target of persuasion is the judge not the interlocutor. This encourages intellectual antagonism without restraint beyond equity nicities. Why bother agreeing anything the other side has said? You're not in the business of persuading the other side.

#### • Intellectual Capture

• No Real Clash or Contension - both sides actually agree. Oftentimes one might find that both sides of the debate actually agreeing with each other. They're merely disagreeing on the details of the policy. The Opposition often agrees with Government's philosophical and moral charges - in that we should help the poorest, the blacks, the coloured<sup>1</sup>, the disabled, the gays, the colonised, the oppressed, or even better, etc - all of that is conceded and very nice and dandy, but it's the Government's policy that the Opposition finds intolerable. Therefore, the contension delivered compared to the contension expected, appears anti-climatic, petty and childish, and stratgically clever but intellectually perfunctorious if not mendacious.

It vaguely reminds Marx's charge against bourgeois parliamentary democracy where the real conflict is not between parties inside parliament but between the bourgeois parliament and the proletariat masses.

Why does this happen? Because (1) it's strategically clever, if not obligatory, as it renders the other's side entire stack of points of philosophical and moral grounds irrelevant, as they were conceded. Effectively, the Government has wasted its own time preaching to the Opposition who never intended to not convert; (2) the debaters don't choose their sides, so they really have no reason

The downstream effect of this is that unless the motion is explicitly philosophical, or in debating parlance a "value motion", debaters often no longer make any attempt to make a principle argument,

#### • Principle arguments are a waste of time.

<sup>&</sup>lt;sup>1</sup>Note, that the usual charges of White Privilege globally enjoyed by the Whites can easily be refashioned into similar charges against the Chinese in South East Asia society - especially in Singapore and Malaysia - but you won't find these arguments as fervently and passionately doled out. It's called the Chinese Privilege. I prophesize, if and once these arguments are made in the South East Asian debating circuit, it will not take long to become a tangible political crisis in the region. Indeed, such discourse has already found itself into Singaporean elections. It must not be allowed to fester to the same degree of prevalance, acceptability, and dispersion as the White Privilege discourse. It will bring disaster to South East Asia.

- Utilitarianism is the one true moral theory the measure of all things.
- Ego Hyperinflation

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These weaknesses in the debating format, combined with the natural ego boosting powers of the very exercise of debating, have begotten a class of intellectuals who are:

- intellectually dishonest and extremely
- Ungentlemanly rhetoric
- Divorced from reality
- Extremely disrespectful and dismissive towards traditions or rules established through evolution, since their utility may not be readily established through simple speech making made without the intelligence provided by history
- Left leaning
- Extremely outgroup focused in terms of welfare, big government since there are no costs to debate land government size

## We need forms of competitive debate - something far more game theoretically unstable

#### Senatorial Debate Roman

- each debater carries with themselves a vote
- Weighted by:
  - Their speaker points?
- Each person writes down the side they support initially this is not to be publicly revealed - if revealed - no problem
- The difference in the pros and cons are to be fought by the debaters
- So if there are 8 people debating, and all 8 voted for "pro", and nobody changed sides, the 8-0 points will awarded to 8 people, so 1 point each.
- But if it began as 7 for 1 against, then 6 points are to be up for grabs. If it ended as 3 for and 4 against, then the 6 points will be shared amongst the 4 winning, so 1.5 points each
- This is the incentive to switch.
- The first speaker gets 2 votes

- Points to the winning side points divided
- Points to the person who stuck to the end
- Minor points to people to people who stuck to the end
- Win
- Lose
- T

The individual pay out matrix of a person:

	Ī	Stick	Switch
Win Lose	Ī	$\frac{3}{2}$	$\frac{1}{0}$

Stick Switch

Win  $\mid 3, 1$ 

Lose |2, 0|

The winning side confers a certain number of points

We need a structure that incentives to switch

• If all 8 debaters started with pro then the game theoretically wise thing to do is just to vote immediately.

Or rather, we need a system anchors then to a particular position - their "interests"

The guiding philosophy of this attempt to redesign a debate format from scratch, is that reality, with its patchwork of real personal interests and individual philosophical commitments, should somehow serve as anchors to reality in this new debate game that we are designing, in the same way that they anchor actual parliamentary debates. The question is then, how?

Obviously, we should bear in mind that this is still a game. We are designing a game, that mimics reality, but is not a copy of reality. And in reality, it is possible, though rare, that people's interest do align perfectly. It is possible for a parliament to vote unanimously, without interfercer or underhand meddling. However, that would not make for a very good debate game. This suggests that while debaters should be allowed to choose their own initial sides, based on their own personal beliefs, we should introduce some kind of entropy to encourage or even force disagreement. In traditional debate formats, this disagreement is completely hardcoded, as teams are allotted proposition and opposition slots with zero agency of their own. Here, I suggest perhaps some kind of soft allotment can be considered here.

In reality, aside from just personal beliefs, individuals are motivated to vote based on their interests - monetary interests, familial obligations, relational

commitments. It would not terribly reductive to coalese all of that into a number represented by numbers.

Suppose each debater begins with a bag of capital, which represents his interests. His bag is composed entirely of two coins: 1\$ and 2\$. They can either represent "proposition" or "opposition" - which is randomly determined at the beginning of the debate. For illustration, we will take 1\$ to represent proposition and 2\$ to mean opposition.

- At the start of the debate, the debater makes known his view on the motion: whether he's for the motion, or whether he's against the motion with his coins. These coins are then put into their respective sides' stashs.
  - A debater may choose to offer nothing, in which case he does forgoes the stick-to-then-end bonus points when the ultimate vote comes.
- After each speech, each debater has to vote. If he votes for the proposition he must vote with the 1\$, and vice versa. His bag of coins therefore constrains how he positions himself.
  - He can put in as many coins as there are people debating.
  - He can choose to offer nothing.
- At the end of the debate, the motion is put to a vote.
- And the winning side takes the winning stack of coins and half of the losing side, and divides it amongst the winners. The remaining half of the losing stack is then divided amongst those who voted for the losing side since the beginning.
  - Note that given this
- if there is a tie, the larger stack wins and is divided amongst the winners. the other stack is then divided amongst those who stuck with their original proposition.

The key is perhaps those who stuck to their guns and won will not get any share of the pot

### Problems of the British Parliamentary style

- Ideological capture by core adjudicators and judges
- Absence of real stakes (infinite money fiat)
- Fundamentally leaning towards youthful idealism—leading to leftism drift
- Performativity—actually both sides agree
- No room for genuine persuasion—the target of persuasion is the judge not the interlocutor

- Intellectual dishonesty—there's no real requirement for one to believe what one is saying; there's no confrontation of one's conscience and convictions against realistic or pragmatic considerations
- There's no training in politicking
- There is no force. Therefore the ultimate maintenance and begetter of parliamentary decorum and intellectual honesty—violence, or the threat thereof—is absent
- Extremely disrespectful and dismissive towards traditions or rules established through evolution, since their utility may not be readily established through simple speech making made without the intelligence provided by history
- As per the analytic tradition of anglo-american philosophy, the British Parliamentary style is utterly incapable in supporting or even tolerating the admission of institutions whose legitimacy is unclear, whose purpose or justification cannot be articulated, or whose rationality is absent. Institutions of these kinds are often called customs, traditions, or even just prejudices dogmas, and myths. These institutions are not well-justified because they weren't designed by man. They evolved into being, through trial and error. Only that which has no history can be defined, only that can be defined can be designed. But customs, traditions, prejudices, dogmas, and myths, are all the product of history. They are not well-justified because they are undefinable. How can you define a woman? The truth is that any answer appealing to sex organs, chromosomes, biology, are also intellectually irrigorous like, though not as functionally ludicrous as those who claim a woman is what you want a woman to be. But, examples -
- Social Contract Theory
- Gender Roles
- Marriage
- Religion -
- Fancy clothes legal wigs, and robes
- Property Rights
- Sexual Taboos, Manners

This is also the problem of modern politics in the English speaking world, and is a broader effect of the Enlightenment project.

- intellectual fictions
- Social Contract Chesterton's Fence (G.K. Chesterton):
- Extremely outgroup focused in terms of welfare, big government since there are no costs to debate government size

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## Successful implementation proposal

Here we present the rules of a round of Roman Senatorial Debate.

- 1. **Number of debaters.** The standard number of debaters is 8. Speaking time is 7 minutes.
  - The Roman Sentorial Debate format should work from 4 debaters to any number of debaters, even beyond 8, but for the purpose of a tournament, rooms should be assumed to accommodate 8 debaters, so the pace would mirror that of the British Parliamentary style.
- 2. Choosing sides. Before the first speech, each debater must reveal in their hand a number of coins. A sum of 1\$ means they support the motion, and so they're on the proposition, Yay (Y). A sum of 2\$ means they're against the motion, and so they're on the opposition, the Nay side (N). Anything else, including 0\$ indicates they're undecided (U). The sides chosen by the debaters must then be recorded, and so they must be seated appropriately. Rearrange the chairs if necessary so it is clear to everywhere all debaters stand. All sums are then pooled into the jackpot. Then they start the debate.
  - The imbalance is intentionally weighted in favor of the motion, making it easier to support than oppose. This is partly to incentivize whoever sponsoring or organizing the debate to feel that their time, energy, and money have been adequately spent in advancing an ideological position that they themselves favour.
  - The higher cost of opposition is also there to ensure that resisting the motion is a matter of genuine conviction, not casual contrarianism—it makes conscience expensive, and therefore meaningful.
  - The sum could be scaled up to (prop: 10\$, opp: 20\$), or even (prop: 10,000\$, opp: 20,000\$), depending on the tournament's debater demographic. But the ratio should be kept at 1:2.
  - Senators who began
- 3. **Speaking order.** There are multiple ways to determine the speaking order. Here we present two methods, one simple and one sophisticated.
  - Simple method. The speaking queue is ordered by Y, N, U, in that order, until all sides run out. If one side has already run out, the next side continues on the queue.
    - Say you have 8 debaters, 7 Ys, and 1Ns, then the queue is (Y, N, Y, Y, Y, Y, Y, Y).
    - Another example, say you have 8 debaters, 3 Ys, 4 Ns, and 1 U, then the queue is (Y, N, U, Y, N, Y, N, N).
    - One more example, say 2 Ys, 5 Ns, and 1 U, then the queue is (Y, N, U, Y, N, N, N, N).
    - The point of stacking the side where there is a large number of supporting senators towards the "end" of the queue is to (1) give the opposing side more "time" for them to make clear their point earlier, and so their speech can have more impact, and (2) to give the more numerous side more time to reconsider their position.

- Sophisticated method. The speaker order is not determined, but bidded. Whenever the floor is open, senators may bid for the speaking slot. There are three bids. All unsuccessful bids are pooled into the jackpot. The highest bidder gets the speaking slot. If there are no bidders, then the speaker to the left of the last speaker gets the speaking slot.
  - Obviously, this method of determining speaking orders is more monetarily competitive, and involves more strategizing. It also inflates the jackpot.
- 4. Each senator makes a 7 minute speech. Any sitting may raise points of information during the 1st and 6th minute of the speech. During any time of their speech, they may add money to the pot.
- 5. Voting and resolution. When all speeches have been, the chamber shall undergo a round of voting. This ultimate round of voting involves no monetary commitment. The vote is recorded by name. Each senator must write down on a piece of paper, his name, the side he votes for, and then all the votes are counted and revealed public. Votes with no names are invalid. Senators whose vote are not recorded are considered to have abstained. Senators may vote in favour, in opposition, or abstain or remain undecided. The threshold for winning is 1 + half of the total number of debaters. This means in a chamber of 8 senators, for Proposition or Opposition to win, it must secure 5 votes. The Proposition wins if and only it has secured 5 votes, in which case we say the motion is passed, or adopted. The Opposition wins if and only if it has secured 5 votes as well, in which case we say the motion is defeated, or rejected. In the case where the vote is split, perhaps evenly 4-4, or 4-3-1 in Y-N-U, then we say the motion is unresolved, in which case we do not say the motion has passed or defeated. In such a case we also say the chamber is tied.
- 6. **Points and Jackpot** The general philosophy is that points is what counts towards breaks senators with the highest points break into the elimination rounds. Jackpot is monetary reward, and fuel. They do not count in any way towards breaks.
  - The points are distributed thus, to every senator:

	stay 留	switch 轉軚	abstain 棄權
win 贏	$\begin{array}{c} 3 \\ 2 \\ 0 \end{array}$	1	0
lose 輸		0	0
tie 和		0	0

- Senators who were undecided at the start of the debate and voted in favour or against the motion are considered to have switched sides, and are rewarded 1 point.
- You can see that those who lost the debate but stuck to their guns are rewarded more highly in terms of points than those who switched sides.
- You can see that ties are very punishing to all senators involved. It basically means they have all wasted time and everyone has lost.
- 7. **Jackpot money distribution.** The jackpot money is split thus:

- s is the total sum in the pot, which always abides by the following:  $s=w_{\widehat{\mathbb H}}+w_{\widehat{\mathbb H}}$
- v is the total number of votes on the winning side, which always abides by the following:  $v=v_{\widehat{\mathbb{H}}}+v_{\widehat{\mathbb{H}}}$
- $w_{\text{all}}$  and  $w_{\text{eff}}$  are defined as such:
  - (a)  $w_{\widehat{\mathbf{g}}} = s \cdot \frac{v_{\widehat{\mathbf{g}}} + 1}{v + 1}$
  - $\text{(b)} \ w_{ij} = s \cdot \frac{v_{ij}}{v+1}$
- To say this without justification, this creates a quasi-prisoner's dilemma situation in the following box, where those who switch sides and win, win money but lose out relatively on points.
- The split of the  $w_{\mathfrak{A}}$  and  $w_{\mathfrak{A}}$  leaves a weird case where everyone switched sides and that side won. In such a case, there'd be nobody to claim the virtual  $\mathfrak{A}$  share. That share can go to many places: (1) the poorest member, (2) the hosting tournament, (3) divided equally amongst all players...(4) taken by the winning side as well...
- The point of the dynamic is: some people care about the money, some people care about passing the motion.
- 8. The rewards table Combining the points and jackpot money distribution, the rewards matrix for each senator is:

	stay 留	switch 轉軚	abstain 棄權
win 贏 lose 輸 tie 和	$ \begin{array}{c} \left(3, \frac{s(v_{\widetilde{\mathbb{H}}}+1)}{v_{\widetilde{\mathbb{H}}}(v+1)}\right) \\ \left(2, 0\right) \end{array} $	$(1,\frac{sv_{\mathrm{opp}}}{v_{\mathrm{opp}}(v+1)}) \\ (0,0)$	(0,0) $(0,0)$
tie 和	(0,0)	(0,0)	(0,0)

As we can see, the switching side has monetary pay out  $\frac{sv_{iij}}{v_{iij}(v+1)} = \frac{s}{v+1}$ .

9. Chairs & Speakers Suppose for the sake of decorum, and perhaps for the sake of maintaining accounting validity, you might want to introduce a chair, or a speaker. The chair's role, unlike in British Parliamentary debate, does not involve judging. He is only involved in making sure the outcome properly computed and resolved.

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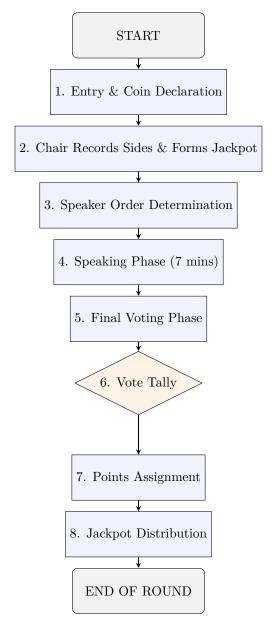


圖 1: Flowchart of a round of the Roman Senatorial Debate

## Payout structure by debater count

Recall that the number of senators can arguably be scaled up to any number. And also recall that the number of votes necessary to win is 1 + half of the total

number of debaters.

Here we present the payout structure for different numbers of debaters and voting scenarios.

$n_{ m debaters}$	$v_{ m win}$	$v_{\mathrm{B}}$	$v_{ m e}$	$w_{\widehat{\mathbf{u}}} = 100 \cdot \frac{v_{\widehat{\mathbf{u}}} + 1}{v_{win} + 1}$	$w_{\ensuremath{ ext{ iny initial}}} = 100 \cdot rac{v_{\ensuremath{ ext{ iny initial}}}}{v+1}$	$w_{lpha/igwedge}$	w <sub>轉/人</sub>
6	4	0	4	20.0	80.0	$n/a^a$	20.0
6	4	1	3	40.0	60.0	40.0	20.0
6	$\bar{4}$	$\bar{2}$	$\check{2}$	60.0	40.0	30.0	$\bar{20.0}$
6	4	$\frac{\bar{2}}{3}$	1	80.0	20.0	26.67	20.0
6	4	4	0	100.0	0.0	25.0	0.0
6	$\frac{4}{5}$	0	5	16.67	83.33	$n/a^a$	16.67
6	5	1	4	33.33	66.67	33.33	16.67
$\frac{6}{6}$	555555	$\frac{\bar{2}}{3}$	$\frac{4}{3}$	50.0	50.0	25.0	16.67
6	5	3	2	66.67	33.33	22.22	16.67
$\stackrel{\circ}{6}$	5	$\frac{4}{5}$	1	83.33	16.67	20.83	16.67
			0	100.0	0.0	20.0	0.0
6	6	0	6	14.29	85.71	n/a <sup>a</sup>	14.29
6	6	1	5	28.57	71.43	28.57	14.29
6	6	$\frac{2}{3}$	$\frac{4}{3}$	42.86	57.14	21.43	14.29
6	6		3	57.14	42.86	19.05	14.29
6	$\stackrel{6}{6}$	$\frac{4}{5}$	2	71.43	28.57	17.86	14.29
6	6	ð	Ĭ	85.71	14.29	17.14	14.29
6	6	6	0	100.0	0.0	16.67	0.0

a n/a, because there are literally no participants who won who stayed on the position that they started with. Obviously this is a degenerate and highly unlikely case. But we still need to figure out how to handle the payout which has no one to receive it. It can either (1) be distributed amongst those who won, (2) go to anyone on the losing side who stuck to their guns, or (3) go to the poorest member, or (4) to the tournament organizer. We are not too interested in the details.

表 1: Payout structure for different numbers of debaters and voting scenarios

$n_{ m debaters}$	$v_{\mathrm{win}}$	$v_{\mathrm{ ilde{a}}}$	$v_{ m e}$	$w_{\widehat{\mathbf{H}}} = 100 \cdot \frac{v_{\widehat{\mathbf{H}}} + 1}{v_{win} + 1}$	$w_{\ensuremath{\scriptscriptstyle{f f \#}}}=100\cdotrac{v_{\ensuremath{\scriptscriptstyle{f f \#}}}}{v+1}$	w <sub>留/人</sub>	$w_{e,A}$
7	4	0	4	20.0	80.0	$n/a^a$	20.0
7				40.0	60.0	4Ó O	20.0
7	$ar{4}$	$\bar{2}$	$\frac{3}{2}$	60.0	40.0	30.0	20.0
7	4	$\begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \end{array}$	1	80.0	20.0	$\begin{array}{c} 30.0 \\ 26.67 \\ 25.0 \end{array}$	$\bar{2}0.0$
7	4 4 4 5 5 5 5 5 5 6		0	100.0	$0.0^{\circ}$	$25.0_{-}$	0.0
7	5	0	5	16.67	83.33	$n/a^a$	16.67
7	5	$     \begin{array}{c}       1 \\       2 \\       3 \\       4 \\       5 \\       0     \end{array} $	4	33.33	66.67	33.33	16.67
7	5	$\overline{2}$	$\frac{4}{3}$	$ 50.0 \\ 66.67 $	50.0	25.0	16.67
<u>7</u>	5	3	2	66.67	33.3 <u>3</u>	22.22	16.67
7	5	4	1	$     \begin{array}{c}       83.33 \\       100.0     \end{array} $	16.67	$\frac{\bar{2}\bar{0}.\bar{8}\bar{3}}{20.0}$	16.67
<u>′</u>	Ö	Ö	0		0.0	20.0	0.0
7			6	14.29	85.71	$\frac{n}{a}$	14.29
7	6	Ĭ	5	28.57	71.43	$\frac{28.57}{21.43}$	14.29
7	Ď	2	4	$\frac{42.86}{57.14}$	$\frac{57.14}{49.96}$	21.43	14.29
<u> </u>	Ö	<u>ئ</u>	ું ૧	57.14	42.86	$\frac{19.05}{17.06}$	$\frac{14.29}{14.20}$
$\frac{l}{2}$	ò	4	1	$71.43 \\ 85.71$	$\begin{array}{c} 42.86 \\ 28.57 \\ 14.29 \end{array}$	$\frac{17.86}{17.14}$	$14.29 \\ 14.29$
4	ĕ	$     \begin{array}{c}       1 \\       2 \\       3 \\       4 \\       5 \\       6     \end{array} $	5 4 3 2 1	100.0	$0.0^{14.29}$	16.67	0.0
7	6 6 6 6 6 7	ŏ	7	12.5	87.5	$n/a^a$	12.5
7				25.0	75.0	25.0	12.5
4	7	2	Š	$\frac{25.0}{37.5}$	62.5	18.75	15.5
7	$\begin{array}{c} 7 \\ 7 \\ 7 \end{array}$	<b>5</b>	$\stackrel{\circ}{\it A}$	50.0	50.0	16.67	$12.5 \\ 12.5 \\ 12.5$
7	Ż	4	$\overline{3}$	62.5	37.5	15.62	15.5
Ż	Ż	$\bar{5}$	$\check{2}$	$\begin{array}{c} 62.5 \\ 75.0 \end{array}$	25.0	15.0	$\bar{1}\bar{2}.reve{5}$
7	7	$\begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \end{array}$	$     \begin{array}{c}       6 \\       5 \\       4 \\       3 \\       2 \\       1     \end{array} $	87.5	$\overline{12.5}$	14.58	$12.5 \\ 12.5 \\ 12.5 $
7	7	7	0	100.0	0.0	14.29	0.0
		r/m					

<sup>&</sup>lt;sup>a</sup> n/a indicates no 留 voters to receive the payout.

表 2: Payout structure for different numbers of debaters and voting scenarios

$n_{ m debaters}$	$v_{\mathrm{win}}$	$v_{\widehat{f a}}$	$v_{ m e}$	$w_{\widehat{\mathbf{H}}} = 100 \cdot \frac{v_{\widehat{\mathbf{H}}} + 1}{v_{win} + 1}$	$w_{ ext{\tiny eff}} = 100 \cdot rac{v_{ ext{\tiny eff}}}{v+1}$	$w_{lpha/igwedge}$	$w_{\phi/A}$
8	5	0	5	16.67	83.33	$n/a^a$	16.67
8	5 555555 6 66666667		$\check{4}$	33.33 50.0 66.67 83.33	66.67	33.33 25.0 22.22 20.83 20.0	16.67
<u>8</u>	Š	$\tilde{2}$	$\tilde{3}$	50.0	50.0	25.0	$\frac{16.67}{16.67}$
8	5	3	$\overline{2}$	66.67	$\begin{array}{c} 66.67 \\ 50.0 \\ 33.33 \end{array}$	22.22	16.67
8	5	4	1	83.33	16.67	20.83	16.67
8	5	$\begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 0 \end{array}$	$\begin{array}{c} 4 \\ 3 \\ 2 \\ 1 \\ 0 \\ 6 \end{array}$	100.0	$0.0_{-}$	20,0	0.0
8	6	0	6	14.29	85.71	$n/a^a$	14.29
8	6	1	5	$\frac{28.57}{2}$	71.43	28.57 $21.43$	14.29
8	Ď	1 2 3 4 5 6	5 4 3 2 1 0	28.57 42.86 57.14 71.43 85.71	57.14 42.86 28.57 14.29	21.43	14.29 14.29 14.29 14.29
Ş	8	٠ 1	સુ	$\frac{5}{71}\frac{1.14}{42}$	42.80	$\frac{19.05}{17.86}$	14.29
8	6	5	1	85.71	14 29	17.14	$14.29 \\ 14.29$
8	<u>6</u>	6	Ō	100.0	0.0	16.67	$0.0^{\circ}$
8	$\check{7}$	ŏ	$\ddot{7}$	12.5	87.5	n/aª	12.5
8	7			$\frac{1}{25.0}$	75.0	25.0	12.5
<u>8</u>	Ż	$\tilde{2}$	Š	$\bar{3}\ddot{7}.\ddot{5}$	62.5	18.75	$1\overline{2}.5$
8	$\overline{2}$	3	$_{4}$	50.0	50.0	16.67	12.5
8	7	$\frac{4}{2}$	3	62.5	37.5	15.62	12.5
8	7	5	2	75.0	25.0	15.0	12.5
8	4	$\begin{array}{c} 1 \\ 23 \\ 4 \\ 56 \\ 7 \end{array}$	Ţ	25.0 37.5 50.0 62.5 75.0 87.5 100.0	75.0 62.5 50.0 37.5 25.0 12.5 0.0	25.0 18.75 16.67 15.62 15.0 14.58 14.29	12.5 12.5 12.5 12.5 12.5 12.5 12.5 0.0
Q	é	ó	Q	11.11	88.89	$\frac{14.29}{\text{n/a}^{\text{a}}}$	11.11
0	0	1	7	$\frac{11.11}{22.22}$	77.78	22 22	11.11
8	8	5	6	$\frac{22.22}{33.33}$	66.67	$\frac{22.22}{16.67}$	11.11
8	8	$\frac{2}{3}$	5	44 44	55.56	14.81	11.11
š	8	4	4	$\begin{array}{c} 44.44 \\ 55.56 \end{array}$	44.44	13.89	11.11
8	8	5	$\bar{3}$	66.67	$\begin{array}{c} \bar{3}\bar{3}.\bar{3}\bar{3} \\ 22.22 \end{array}$	14.81 13.89 13.33	$11.\overline{11}$
8	8	<u>6</u>	$^{2}$	77.78	22.22	-12.96	11.11
© ® © ® ® ® ® ® ® ® ® ® ® ® ® ® ® ® ® ®	777777888888888888888888888888888888888	1 2 3 4 5 6 7 8	$\begin{matrix} 65443210876543210\\ 876543210\end{matrix}$	88.89	11.11	$\frac{12.7}{12.5}$	11.11
8	8	8	U	100.0	0.0	12.5	0.0

a n/a indicates no 留 voters to receive the payout.

表 3: Payout structure for different numbers of debaters and voting scenarios

				$w_{\rm cr} = 100 \cdot \frac{v_{\rm ff}+1}{}$	V±±		
$n_{\rm debaters}$	$v_{\mathrm{win}}$	$v_{\cong}$	$v_{\scriptscriptstyle{ m e}\!\scriptscriptstyle{ m p}}$	$w_{\widehat{\mathbf{g}}} = 100 \cdot \frac{v_{\widehat{\mathbf{g}}+1}}{v_{win}+1}$	$w_{ extstyle   i} = 100 \cdot rac{v_{ extstyle   i}}{v+1}$	$w_{lpha/igwedge}$	$w_{e/L}$
9	5	0	5	16.67	83.33	n/a <sup>a</sup> 33.33 25.0 22.22 20.83 20.0 n/a <sup>a</sup> 28.57 21.43	16.67
9	5	1	$_{4}$	33.33	$\begin{array}{c} 66.67 \\ 50.0 \\ 33.33 \end{array}$	33.33	$\frac{16.67}{16.67}$
9	5	$\frac{2}{2}$	3	$ 50.0 \\ 66.67 $	50.0	$\frac{25.0}{25.0}$	16.67
9	9 5	$     \begin{array}{c}       1 \\       2 \\       3 \\       4 \\       5 \\       0     \end{array} $	$\begin{array}{c} 4 \\ 3 \\ 2 \\ 1 \\ 0 \\ 6 \end{array}$	$\begin{array}{c} 00.07 \\ 83.33 \end{array}$	33.33 16.67	20.83	$16.67 \\ 16.67$
ğ	5	$\dot{\bar{5}}$	Ō	100.0	0.0	20.0	0.0
9	6			14.29	85.71	$n/a^a$	14.29
9	6	1	5	$\frac{28.57}{6}$	$\begin{array}{c} 71.43 \\ 57.14 \end{array}$	28.57	14.29 14.29 14.29 14.29
9	6	2	$\frac{4}{2}$	$rac{42.86}{57.14}$	57.14	$\frac{21.43}{19.05}$	14.29
9	6	4	$\frac{3}{2}$	71.43	$\begin{array}{c} 42.86 \\ 28.57 \end{array}$	17.86	14.29 $14.29$
$\tilde{9}$	$\check{6}$	$\bar{5}$	$\bar{1}$	85.71	14.29	17.14	14.29
9	6	$\begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 0 \end{array}$	$\begin{array}{c} 5 \\ 4 \\ 3 \\ 2 \\ 1 \\ 0 \\ 7 \end{array}$	100.0	$ \begin{array}{c} 0.0 \\ 87.5 \end{array} $	16.67	$0.0 \\ 12.5$
9	7		(	$   \begin{array}{c}     12.5 \\     25.0 \\     37.5   \end{array} $	87.5	$\frac{n}{a^a}$	12.5
9	7	$\frac{1}{2}$	5	$\frac{25.0}{37.5}$	$75.0 \\ 62.5$	$\frac{25.0}{18.75}$	$\frac{12.5}{12.5}$
ğ	7	$     \begin{array}{c}       1 \\       2 \\       3 \\       4 \\       5 \\       6 \\       7 \\       0     \end{array} $	$\overset{}{4}$	$\begin{array}{c} 50.0 \\ 62.5 \end{array}$	$\begin{array}{c} 50.0 \\ 37.5 \\ 25.0 \\ 12.5 \end{array}$	16.67	12.5 12.5 12.5 12.5 12.5 12.5
9	7	$\frac{4}{2}$	3	62.5	37.5	15.62	12.5
9	7	5 6	2	$\begin{array}{c} 75.0 \\ 87.5 \end{array}$	$\frac{25.0}{12.5}$	$15.0 \\ 14.58$	$\frac{12.5}{12.5}$
9	7	7	Ô	100.0	0.0	14 20	0.0
9	8	0	8	11.11	$ \begin{array}{c} 0.0 \\ 88.89 \end{array} $	n/a <sup>a</sup> 22.22 16.67 14.81 13.89 13.33	11.11
9	8	1	7	$\frac{22.22}{33.33}$	77 78	22.22	11.11
9	8	$\frac{2}{3}$	6	33.33	66.67	16.67	$\frac{11.11}{11.11}$
9	8	$\frac{3}{4}$	3 4	$\begin{array}{c} 44.44 \\ 55.56 \end{array}$	$\begin{array}{r} 66.67 \\ 55.56 \\ 44.44 \\ 33.33 \\ 22.22 \end{array}$	13.89	11:11
9	8	$\overline{5}$	$\tilde{3}$	66.67	33.33	13.33	$\bar{1}\bar{1}.\bar{1}\bar{1}$
9	8	6	2	77.78	22.22	12.96	11.11
9	8	8	1	$\begin{array}{c} 88.89 \\ 100.0 \end{array}$	$\substack{11.11\\0.0}$	$\frac{12.7}{12.5}$	$^{11.11}_{0.0}$
ğ	$\overset{\circ}{9}$	ŏ	9	10.0	90.0	$n/a^a$	10.0
9	9	ĭ	8	20.0	80.0	20.0	10.0
9	9	2	$\frac{7}{6}$	30.0	70.0	$     \begin{array}{c}       15.0 \\       13.33     \end{array} $	10.0
9	9	ა 4	9	$\frac{40.0}{50.0}$	$\frac{60.0}{50.0}$	$13.33 \\ 12.5$	$\frac{10.0}{10.0}$
$\overset{\circ}{9}$	9	$\overline{5}$	$\overset{3}{4}$	60.0	40.0	12.0	$10.0 \\ 10.0$
9	9	<u>6</u>	$\bar{3}$	70.0	30.0	11.67	10.0
9	9	7	2	80.0	20.0	$\frac{11.43}{11.25}$	$\frac{10.0}{10.0}$
೧೧೦೧೦ ೧೦೧೦೧೦ ೧೦೦೧೦೦೦ ೧೦೦೦೦೦೦೦೦ ೧೦೦೦೦೦೦	5 555556 6666667 77777778 88888889 9999999999	$\begin{array}{c} 1 \\ 23 \\ 45 \\ 67 \\ 80 \\ 12 \\ 34 \\ 56 \\ 789 \end{array}$	$\frac{65432108765432109876543210}{6543210}$	$90.0 \\ 100.0$	$^{10.0}_{0.0}$	$\frac{11.25}{11.11}$	$\frac{10.0}{0.0}$
		1577					0.0

a n/a indicates no 留 voters to receive the payout.

表 4: Payout structure for different numbers of debaters and voting scenarios

$n_{ m debaters}$	$v_{\mathrm{win}}$	$v_{\mathrm{a}}$	$v_{ m e}$	$w_{\widehat{\mathbf{H}}} = 100 \cdot \frac{v_{\widehat{\mathbf{H}}} + 1}{v_{win} + 1}$	$w_{ ext{\tiny #\#}} = 100 \cdot rac{v_{ ext{\tiny #\#}}}{v+1}$	w <sub>留/人</sub>	w <sub>轉/人</sub>
10	6	0	6	14.29	85.71	n/a <sup>a</sup> 28.57 21.43	14.29
$^{10}_{10}_{10}$	6	$     \begin{array}{c}       1 \\       2 \\       3 \\       4 \\       5 \\       6 \\       0     \end{array} $	5	$\frac{28.57}{10.00}$	71.43 57.14 42.86 28.57 14.29	28.57	14.29
10 10	6	3	$\frac{4}{3}$	$\frac{42.86}{57.14}$	57.14 42.86	21.43 19.05	14.29 14.29 14.29 14.29
10	ĕ	$\frac{3}{4}$	$\tilde{2}$	71.43	28.57	$     \begin{array}{r}       19.05 \\       17.86 \\       17.14     \end{array} $	$14.\overline{29}$
$\begin{array}{c} 10 \\ 10 \end{array}$	6	5	1	$\begin{array}{c} 85.71 \\ 100.0 \end{array}$	$^{14.29}_{0.0}$	$\frac{17.14}{16.67}$	$\frac{14.29}{0.0}$
10	7	Õ	7	12.5	87.5	n/a <sup>a</sup>	12.5
	$\dot{7}$		6	25.0 25.0 37.5 50.0 62.5 75.0 87.5	75.0 62.5 50.0 37.5 25.0 12.5	$\frac{n}{a^{a}}$	12.5 12.5 12.5 12.5 12.5 12.5
10 10 10 10 10 10	$\frac{7}{2}$	$\frac{2}{3}$	5	$\frac{37.5}{6}$	62.5	$18.75 \\ 16.67$	$\frac{12.5}{12.5}$
10	$\frac{\prime}{7}$	3 4	$\frac{4}{3}$	62.5	$\frac{30.0}{37.5}$	15.62	$12.5 \\ 12.5$
10	Ż	$\bar{5}$	$\tilde{2}$	$7\overline{5}.0$	25.0	$15.0 \\ 14.58$	12.5
10 10	$\frac{7}{7}$	1 2 3 4 5 6 7	$\frac{1}{0}$	$   \begin{array}{c}     87.5 \\     100.0   \end{array} $	12.5	$\frac{14.58}{14.20}$	$\frac{12.5}{0.0}$
10 10	8	Ó	8	11.11	0.0 88.89	$n/a^a$	11.11
10 10	8		7	$\frac{22.22}{33.33}$	77.78	22'.22	11.11
$^{10}_{10}$	8	$\frac{2}{2}$	6	$\begin{array}{c} 33.33 \\ 44.44 \end{array}$	$\frac{66.67}{55.56}$	16.67	$\frac{11.11}{11.11}$
10	8	$\frac{3}{4}$	$\frac{3}{4}$	55.56	$\frac{33.30}{44.44}$	13.89	11.11
$\overset{\bar{1}\overset{\circ}{0}}{10}$	8	5	3	66.67	44.44 33.33	14.29 n/a <sup>a</sup> 22.22 16.67 14.81 13.89	11.11
10 10	8	7	1	77.78 88.89	$\begin{array}{c} 22.22 \\ 11.11 \end{array}$	$\frac{12.90}{12.7}$	$\frac{11.11}{11.11}$
$\begin{array}{c} 10 \\ 10 \end{array}$	8	1 2 3 4 5 6 7 8 0	Õ	100.0	0.0	12.96 12.7 12.5 n/a <sup>a</sup>	0.0
$\frac{10}{10}$	9		9	10.0	90.0	$\frac{n/a^{a}}{20.0}$	10.0
$\overset{10}{10}$	9	$\frac{1}{2}$	7	$\frac{20.0}{30.0}$	$\frac{80.0}{70.0}$	$\frac{20.0}{15.0}$	$\frac{10.0}{10.0}$
10	ğ	$\bar{3}$	6	40.0	60.0	13.33 $12.5$	10.0
$\begin{array}{c} 10 \\ 10 \end{array}$	9	$\frac{4}{5}$	5 4	$\begin{array}{c} 50.0 \\ 60.0 \end{array}$	$\begin{array}{c} 50.0 \\ 40.0 \end{array}$	$\frac{12.5}{12.0}$	$\frac{10.0}{10.0}$
10 10	$\S$	$\ddot{6}$	$\bar{3}$	70.0	30.0	$11.67 \\ 11.43$	10.0
$\frac{10}{10}$	9	7	2	$\begin{array}{c} 80.0 \\ 90.0 \end{array}$	$\frac{20.0}{10.0}$	11.43	$\frac{10.0}{10.0}$
$\overset{\bar{1}\overset{\circ}{0}}{10}$	66666667777777788888888899999999999	1 23 4 5 6 7 8 9 0	543210765432108765432109876543210	100.0	$0.0 \\ 0.0$	$\frac{11.25}{11.11}$	0.0
10	10		10	9.09	90.91	$n/a^a$	9.09
$^{10}_{10}$	$\frac{10}{10}$	$\frac{1}{2}$	$\frac{9}{8}$	$\frac{18.18}{27.27}$	$\frac{81.82}{72.73}$	$18\dot{.}18\ 13.64$	$9.09 \\ 9.09$
10	10	$\frac{2}{3}$	$\overset{\circ}{7}$	$\frac{27.27}{36.36}$	63.64	12.12	9.09
10	10	$\dot{4}$	6	45.45	$ \begin{array}{r} 63.64 \\ 54.55 \end{array} $	12.12 11.36	9.09
$10 \\ 10$	$\frac{10}{10}$	5 6	$\frac{5}{4}$	$ 54.55 \\ 63.64 $	$\begin{array}{r} 45.45 \\ 36.36 \end{array}$	10.91 10.61 10.39	$9.09 \\ 9.09$
10 $10$	10	7	$\frac{3}{2}$	72.73	$\begin{array}{c} 27.27 \\ 18.18 \end{array}$	10.35	9.09
$\begin{array}{c} 10 \\ 10 \end{array}$	$^{10}_{10}$	$     \begin{array}{c}       1 \\       2 \\       3 \\       4 \\       5 \\       6 \\       7 \\       8 \\       9 \\       10 \\    \end{array} $	9876543210	$   \begin{array}{r}     8\overline{1}.82 \\     90.91 \\   \end{array} $	18.18 9.09	10.23	$9.09 \\ 9.09$
10	10	10	Ö	100.0	$   \begin{array}{c}     9.09 \\     0.0   \end{array} $	$\frac{10.1}{10.0}$	$0.0^{\circ}$
a / . :1		· 幻		4			

a n/a indicates no 留 voters to receive the payout.

表 5: Payout structure for different numbers of debaters and voting scenarios

$n_{ m debaters}$	$v_{\mathrm{win}}$	$v_{\cong}$	$v_{ m e}$	$w_{\widehat{\mathbf{g}}} = 100 \cdot \frac{v_{\widehat{\mathbf{g}}} + 1}{v_{win} + 1}$	$w_{\cite{phi}} = 100 \cdot rac{v_{\cite{phi}}}{v+1}$	w <sub>留/人</sub>	w <sub>轉/人</sub>
11	6	0	6	14.29 $28.57$ $42.86$ $57.14$	85.71	n/a <sup>a</sup> 28.57 21.43 19.05	$14.29 \\ 14.29$
11 11 11 11 11 11	6	$     \begin{array}{c}       1 \\       2 \\       3 \\       4 \\       5 \\       6 \\       0     \end{array} $	4	$\frac{26.37}{42.86}$	71.43 57.14 42.86 28.57 14.29	21.43	14.29 14.29 14.29 14.29 14.29
11 11	6	$\frac{3}{4}$	$\frac{3}{2}$	(1.45	$\frac{42.86}{28.57}$	$19.05 \\ 17.86 \\ 17.14$	$14.29 \\ 14.29$
11 11	$\frac{6}{6}$	$\frac{5}{6}$	$\frac{1}{0}$	$\begin{array}{c} 85.71 \\ 100.0 \end{array}$	$^{14.29}_{0.0}$	16.67	0.0
11	$\frac{7}{7}$	0	7	12.5	87.5	n/a	12.5
11 11 11	$\frac{7}{2}$	$\frac{1}{2}$	5	$\begin{array}{c} 25.0 \\ 27.5 \\ \end{array}$	$75.0 \\ 62.5$	$\frac{25.0}{18.75}$	$12.5 \\ 12.5$
11 11	7	$\frac{3}{4}$	$\frac{4}{3}$	50.0 62.5 75.0	$\begin{array}{c} 5\overline{0}.0\\ 37.5\\ 25.0\end{array}$	$\frac{16.67}{15.62}$	$\begin{array}{c} 12.5 \\ 12.5 \end{array}$
11 11 11	$\frac{7}{7}$	1 2 3 4 5 6 7 0	$\frac{2}{1}$	$75.0 \\ 87.5$	12.5	17.4 25.0 18.75 16.67 15.62 15.0 14.58	12.5 12.5 12.5 12.5 12.5 12.5
11 11	7 8	7	$\frac{\bar{0}}{8}$	100.0 11.11	0.0	14.29 n/2ª	0.0 11.11
	8		7	22.22	77.78 66.67 55.56 44.44	14.38 14.29 n/a <sup>a</sup> 22.22 16.67 14.81 13.89	11.11
11 11	8	$\frac{2}{3}$	5	22.22 33.33 44.44 55.56	66.67 55.56	$\frac{16.67}{14.81}$	$\frac{11.11}{11.11}$
11 11 11 11 11	8	$\frac{4}{5}$	$\frac{4}{3}$	bb b7	$\frac{44.44}{33.33}$	$\frac{13.89}{13.33}$	$11.11 \\ 11.11$
11 11 11	8	$\frac{6}{7}$	$\frac{\check{2}}{1}$	77.78 88.89 100.0	33.33 22.22 11.11 0.0	12.96 12.7	$\frac{11.11}{11.11}$
<u>1</u> 1	6666667777777788888888899999999999	1 2 3 4 5 6 7 8 0	543210765432108765432109876543210	100.0	0.0	12.96 12.7 12.5 n/a <sup>a</sup> 20.0 15.0 13.33 12.5 12.0 11.67 11.43 11.25 11.11	0.0
11 11	9	1	8	$10.0 \\ 20.0 \\ 30.0$	$90.0 \\ 80.0 \\ 70.0$	$^{ m n/a}_{20.0}$	$\frac{10.0}{10.0}$
11 11 11 11 11 11 11 11	9 9	1 23 4 5 6 7 8 9 0	$\frac{7}{6}$	40.0	$70.0 \\ 60.0$	$\frac{15.0}{13.33}$	$\frac{10.0}{10.0}$
11 11	9	$\frac{4}{5}$	$\frac{5}{4}$	$\begin{array}{c} 50.0 \\ 60.0 \end{array}$	$\begin{array}{c} 50.0 \\ 40.0 \end{array}$	$\frac{12.5}{12.0}$	$\frac{10.0}{10.0}$
11	9	$\frac{6}{7}$	$\frac{1}{3}$	70.0 80.0	$\frac{30.0}{20.0}$	11.67	$10.0 \\ 10.0$
11	9	8	1	90.0 100.0	10.0	11.25	10.0
11	10		10	9.09	$0.0 \\ 90.91$	$\frac{11.11}{n/a}$	$0.0 \\ 9.09$
11 11	$\frac{10}{10}$	$\frac{1}{2}$	9	18.18 27.27 36.36 45.45 54.55	81.82 72.73 63.64 54.55 45.45	$\frac{18.18}{13.64}$	$\frac{9.09}{9.09}$
11 11	$\overset{1}{\overset{\circ}{10}}$	$\bar{3}$	$\tilde{7}$	36.36 45.45	63.64	12.12	9.09
11 11 11 11 11 11	$\frac{10}{10}$	5	5	54.55 63.64	$\begin{array}{c} 45.45 \\ 45.36 \end{array}$	10.91	9.09 9.09
11 11	$\begin{array}{c} 10 \\ 10 \\ 10 \end{array}$	1 2 3 4 5 6 7 8 9	9 87 65 4 32 1 0	72.73	$\begin{array}{c} 30.30 \\ 27.27 \\ 18.18 \end{array}$	11.11 n/a <sup>a</sup> 18.18 13.64 12.12 11.36 10.91 10.61 10.39 10.23	$9.09 \\ 9.09 \\ 9.09$
11 11 11	10	8	$\frac{2}{1}$	72.73 81.82 90.91	9.09		9.09
11 11	$\begin{array}{c} 10 \\ 11 \end{array}$	$ \begin{array}{c} 10 \\ 0 \end{array} $	0 11	$\frac{100.0}{8.33}$	$0.0 \\ 91.67$	10.0 n/a <sup>a</sup> 16.67	$\begin{array}{c} 0.0 \\ 8.33 \end{array}$
11	11 11	$\tilde{1}$		16.67 25.0 33.33	83.33 75.0	16.67	8.33
11 11 11 11 11	$\begin{array}{c} 11\\11\\11\end{array}$	$\frac{2}{3}$	8	$\frac{20.0}{33.33}$	66.67 58.33	11.11	8.33 8.33
11 11	11	1 2 3 4 5 6 7 8 9 10	$\stackrel{\prime}{6}$	$\begin{array}{c} 41.67 \\ 50.0 \\ 58.33 \end{array}$	50.0	$ \begin{array}{c} 10.07 \\ 12.5 \\ 11.11 \\ 10.42 \\ 10.0 \\ \end{array} $	33333333333333333333333333333333333333
11 11	$\frac{11}{11}$	$\frac{6}{7}$	$\overset{5}{4}$	66.67	$\begin{array}{c} 41.67 \\ 33.33 \\ 25.0 \end{array}$	$\frac{9.72}{9.52}$	$\frac{8.33}{8.33}$
11 11	$ar{1}ar{1} \ 11$	$\frac{8}{9}$	$\frac{3}{2}$	$75.0 \\ 83.33$	$\begin{array}{c} 25.0 \\ 16.67 \end{array}$	9.72 9.52 9.38 9.26 9.17	$8.33 \\ 8.33$
11 11 11 11 11 11	11 11 11	$\frac{10}{11}$	10 9 8 7 6 5 4 3 2 1 0	$91.67 \\ 100.0$	$   \begin{array}{r}     16.67 \\     8.33 \\     0.0   \end{array} $	$\frac{9.17}{9.09}$	$\begin{array}{c} 8.33 \\ 0.0 \end{array}$
- 11	11	11	U	100.0	0.0	0.00	0.0

<sup>&</sup>lt;sup>a</sup> n/a indicates no 留 voters to receive the payout.

表 6: Payout structure for different numbers of debaters and voting scenarios

$n_{ m debaters}$	$v_{\mathrm{win}}$	$v_{\mathrm{ ilde{a}}}$	$v_{ m e}$	$w_{\widehat{\mathbf{H}}} = 100 \cdot \frac{v_{\widehat{\mathbf{H}}} + 1}{v_{win} + 1}$	$w_{ ext{\tiny #\#}} = 100 \cdot rac{v_{ ext{\tiny #\#}}}{v+1}$	$w_{lpha/igwedge}$	$w_{e, \uparrow}$
12	7	0	7	12.5 25.0 37.5 50.0 62.5 75.0 87.5 100.0	87.5	$n/a^a$	12.5
$\frac{12}{12}$	$\frac{7}{7}$	$     \begin{array}{c}       1 \\       2 \\       3 \\       4 \\       5 \\       6 \\       7     \end{array} $	5	$\frac{25.0}{37.5}$	75.0 62.5 50.0 37.5 25.0 12.5	$\frac{25.0}{18.75}$	12.5 12.5 12.5 12.5 12.5 12.5
$\frac{12}{12}$	$\frac{7}{7}$	3 4	$\frac{4}{3}$	$\frac{50.0}{62.5}$	$\frac{50.0}{37.5}$	15.62	$12.5 \\ 12.5$
$\frac{12}{12}$	$\frac{7}{7}$	$\overset{5}{6}$	$\frac{2}{1}$	$\begin{array}{c} 75.0 \\ 87.5 \end{array}$	$\begin{array}{c} 25.0 \\ 12.5 \end{array}$	$\frac{15.0}{14.58}$	$\frac{12.5}{12.5}$
$\frac{12}{12}$	7 8	$\begin{array}{c} 7 \\ 0 \end{array}$	$\frac{0}{8}$	$100.0 \\ 11.11$		$\frac{14.29}{n/a^a}$	$0.0 \\ 11.11$
$\frac{12}{12}$	8		$\frac{\tilde{7}}{6}$	22.22	77.78 66.67	$\frac{22.22}{16.67}$	11.11 11.11
$\frac{12}{12}$	8	$\frac{2}{3}$	5	44.44 55.56	88.89 77.78 66.67 55.56 44.44	14.81	11.11 11.11
$\frac{12}{12}$	8	5	3	$\frac{55.50}{66.67}$	33.33 33.33	13.33	11.11
$\frac{12}{12}$	8	1 2 3 4 5 6 7 8 0	$\frac{2}{1}$	22.22 33.33 44.44 55.56 66.67 77.78 88.89	44.44 33.33 22.22 11.11 0.0 90.0	$\frac{12.96}{12.7}$	11.11 $11.11$
$\frac{12}{12}$	8 9		9	100.0 $10.0$	90.0	$\frac{12.5}{n/a^a}$	$0.0 \\ 10.0$
$\frac{12}{12}$	9	$\frac{1}{2}$	$\frac{8}{7}$	$\begin{array}{c} 20.0 \\ 30.0 \\ 40.0 \end{array}$	80.0 70.0 60.0	$\frac{20.0}{15.0}$	$\frac{10.0}{10.0}$
$\frac{12}{12}$	9	$\frac{3}{4}$	$\frac{6}{5}$	$\frac{40.0}{50.0}$	50.0	$\frac{13.33}{12.5}$	$10.0 \\ 10.0 \\ 10.0$
$\frac{12}{12}$	9	5 6	$\frac{4}{3}$	$\frac{60.0}{70.0}$	40.0	$\frac{12.0}{11.67}$	$\begin{array}{c} 10.0 \\ 10.0 \end{array}$
$\frac{12}{12}$	77777778888888889999999999	1 23 4 5 6 7 8 9 0	65432108765432109876543210	80.0 90.0 100.0	$\begin{array}{c} 30.0 \\ 20.0 \\ 10.0 \end{array}$	$\frac{11.43}{11.25}$	$\frac{10.0}{10.0}$
$\frac{12}{12}$	9 10	ğ 0	$\stackrel{\circ}{10}$	100.0 9.09	0.0	$11.\overline{11}$	$0.0 \\ 9.09$
12	10 10 10	1	9	18.18	90.91 81.82 72.73 63.64 54.55 45.45	18.18	9.09
$\frac{12}{12}$	10	$\frac{2}{3}$	$\frac{\circ}{7}$	$\frac{21.21}{36.36}$	63.64 63.64	13.04 $12.12$	9.09 9.09
$\frac{12}{12}$	$\frac{10}{10}$	5	5	45.45 54.55 62.64	45.45 26.26	10.91	9.09 9.09
$\frac{12}{12}$	$\frac{10}{10}$	1 2 3 4 5 6 7 8 9	9 87 65 4 32 1 0	$\begin{array}{c} 03.04 \\ 72.73 \\ 21.73 \end{array}$	$\frac{30.30}{27.27}$	10.01 $10.39$	9.09 9.09
$\frac{12}{12}$	$\frac{10}{10}$	8	1	$\begin{array}{c} 81.82 \\ 90.91 \\ \end{array}$	9.09	10.23 $10.1$	$9.09 \\ 9.09$
$\frac{12}{12}$	$\frac{10}{11}$	$ \begin{array}{c} 10 \\ 0 \end{array} $	11	18.18 27.27 36.36 45.45 54.55 63.64 72.73 81.82 90.91 100.0 8.33 16.67 25.0 33.33 41.67 50.0 58.33	36.36 27.27 18.18 9.09 0.0 91.67 83.33 75.0 66.67 58.33 50.0 41.67 33.33	$\frac{10.0}{\mathrm{n/a^a}}$	$0.0 \\ 8.33$
$\frac{12}{12}$	11 11 11	$\frac{1}{2}$	$\frac{10}{9}$	$\begin{array}{c} 16.67 \\ 25.0 \end{array}$	$83.33 \\ 75.0$	$\frac{16.67}{12.5}$	$8.33 \\ 8.33$
$\frac{12}{12}$	11 11	$\frac{3}{4}$	8	$\begin{array}{c} 33.33 \\ 41.67 \end{array}$	$\frac{66.67}{58.33}$	$\frac{11.11}{10.42}$	$\frac{8.33}{8.33}$
$1\overline{2}$	11 11 11	$\frac{\bar{5}}{6}$	6 5	50.0 $58.33$	$50.0 \\ 41.67$	$\frac{10.0}{9.72}$	8.33 8.33
$1\overline{2}$	11	1 2 3 4 5 6 7 8 9 10	10 9 8 7 6 5 4 3 2 1 0	66.67 75.0 83.33 91.67 100.0	33.33 25.0	n/a <sup>a</sup> 25.0 18.75 16.67 15.62 15.0 14.58 14.29 n/a <sup>a</sup> 22.22 16.67 14.81 13.83 12.96 12.7 12.5 n/a <sup>a</sup> 20.0 15.0 13.33 12.5 11.67 11.43 11.25 11.11 1.43 11.25 11.11 1.43 11.36 10.39 10.23 10.1 10.0 16.67 12.5 11.11 10.0 16.67 12.5 11.11 10.0 16.67 12.5 11.11 10.0 17.0 18.18 18.18 18.18 18.18 19.10 19.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
$\frac{12}{12}$	11 11 11	ğ 10	$\frac{2}{1}$	83.33 91.67	25.0 16.67 8.33 0.0	$9.26 \\ 9.17$	8.33 8.33
12	11	11 0	$ \begin{array}{c} \dot{0}\\ 12 \end{array} $	100.0	(19.31	9.09 n/2ª	$0.0 \\ 7.69$
$\frac{12}{12}$	$\frac{12}{12}$		11	15.38	84.62 86.62	15.38	7.69
$\frac{12}{12}$	$\frac{12}{12}$	$\frac{2}{3}$	9	$\frac{23.08}{30.77}$	84.62 76.92 69.23 61.54	$11.54 \\ 10.26$	7.69 7.69
$\frac{12}{12}$	$\frac{12}{12}$	$\frac{4}{5}$	8	$\frac{38.46}{46.15}$	$\begin{array}{c} 61.54 \\ 53.85 \end{array}$	$9.62 \\ 9.23$	$\frac{7.69}{7.69}$
$\frac{12}{12}$	$\frac{12}{12}$	1 23 4 5 6 7 8 9	6 5	$\begin{array}{c} 7.69 \\ 15.38 \\ 23.08 \\ 30.77 \\ 38.46 \\ 46.15 \\ 53.85 \\ 61.54 \\ 69.23 \\ 76.92 \end{array}$	53.85 46.15 38.46 30.77	n/a <sup>a</sup> 15.38 11.54 10.26 9.62 9.23 8.97 8.79 8.65 8.46	7.69 <b>7</b> .69
$\frac{12}{12}$	$\frac{12}{12}$	8 9	$\frac{4}{3}$	$\begin{array}{c} 69.23 \\ 76.92 \end{array}$	$\begin{array}{c} 30.77 \\ 23.08 \\ 15.38 \end{array}$	$8.65 \\ 8.55$	$\frac{7.69}{2.69}$
12 12 12 12 12 12 12 12 12 12 12 12 12 1	12 12 12 12 12 12 12 12 12 12 12 12	$\frac{10}{11}$	$   \begin{array}{c}     10 \\     9 \\     7 \\     6 \\     5 \\     4 \\     3 \\     2 \\     1 \\     0   \end{array} $	84.62 92.31 100.0	$\begin{array}{c} 15.38 \\ 7.69 \\ 0.0 \end{array}$	8.46 8.39 8.33	7.69 7.69 7.69 7.69 7.69 7.69 7.69 7.69
12	12	12	0	100.0	0.0	8.33	0.0

a n/a indicates no 留 voters to receive the payout.

表 7: Payout structure for different numbers of debaters and voting scenarios

### Elimination mechanism

Unlike the British Parliamentary style tournament where you can set the number of rooms depending on how many outrounds you want, and then the teams are exponentially and deterministically eliminated, the Roman Senatorial Debate does not work like that.

A chamber might fail to resolve the motion, in which case every senator gets 0 points. A chamber might also resolve the motion unanimously without switching sides, in which case every senator gets 3 points. These irregularities pose difficulties to a straightforward elimination mechanism like that in the British Parliamentary style tournament, as a chamber might return all 8 senators with 3 points, or all senators with 0 points.

- 1. Admission to elimination rounds. At breaks, teams are admitted into the elimination rounds by virtue of the points they've accumulated.
- 2. **Tie resolution.** In any case where there is a tie, this is to either be resolved by money, or force. In the case where the option to resolve it by force is enabled, any tied member has the right to resolve it by trial by combat. Women may be allowed to fight, but they are accorded the privilege to find a champion. Men are not accorded the privilege of champerty. Champions must be participating senators. This is in line with the general philosophy of the tournament that debate, politics, and intellectualism makes sense only if it is a game of honour and honour only emerges if there is an ultimate backstop of violence.
- 3. **Points carryover.** Senators will continue to inherit their points from the preliminary rounds. Senators WILL NOT have their accumulated points reset to 0 in the breakrounds. The point of this is to give intellectual autonomy to the senators to stand their ground.
- 4. **Number of participants.** The number of senators the tournament admits into the outrounds is the number of rounds times 8 senators. we have:
  - (a) octos (8 strongest rooms, 4th last round): 64  $\wedge$
  - (b) quarters (4 strongest rooms, 3rd last round): 32  $\land$
  - (c) semis (2 strongest rooms, 2nd last round): 16  $\land$
  - (d) grand final (last round): 8 人.
- 5. **Elimination mechanism.** In each of the outrounds, the aggregate half of the rooms with the lowest points are eliminated. So unlike BP where the result of each room individually decides the outcome of the outround, here the aggregate result of all rooms in the outround decides the outcome.
- 6. The Market of Speech and Influence. Since senators carry over their points from the preliminary rounds, those with high scores can speak freely with their immediate fear of elimination heavily discounted. This grants intellectual autonomy to top-performing senators, allowing them to assert their own private views with confidence and demonstrate their full intellectual prowess. This means there is now a privilege to speak, where you can basically air your own views on a topic, and you granted an audience.

This, on the whole, means that the tournament becomes a market where the commodity of speech and influence can be acquired by a combination of strategic political manoeuvre and careful money management.

7. The Grand Final. How is the winner of the Grand Final determined? This is tricky and it depends on what matters to you. The recommendation is that the you still run the debate as a normal round, but depending on the tournament's interest, one may arbitrarily define the "winner(s)" to be whoever stuck to his guns and whose side resolved the motion. But if for reasons of ceremony or competition the tournament must produce a "winner", they might resolve to define the winner as the side that the chamber resolved in favour for.

## Emergent phenomenon

It is very likely that this set of rules will yield emergent phenomena. It is my sincere hope that the game, along with its emergent phenomena, will beget and engender virtues in its participants: honour, intellectualism, honesty, duty, and most importantly, the prudent and intelligent use of force. The pen that is dancing is only as mighty as the sword that is at rest.

## Bribery

Consider the case where in the first round of votes, the vote distribution is 7 Y and 1 N. This is a highly stable state. The 7 participants have no incentive to switch their vote. Anybody switching would be giving up 3 points for at best 1 point, and the jackpot sum that's already in the bag.

Then, what's the point of the debate here? There is no point. There would only be a point to debate if there's a destablizing force of some sort.

If things have been left to their own devices, then the inevitable solution will emerge by itself - bribery, vote-buying.

Vote-buying, from other senators, and only from other senators, serves as a reasonable destablizing force.

If the form of vote-buying enabled involves the inflation of the supply of votes, then debate will become a simple matter of money takes all. This is not a good thing. Vote inflation must not be allowed. It destroys the need to debate, the need to persuade, and the need to offer a bribe. It eliminates politicking and favour-trading - which is the whole point of this exercise. But if vote-buying is restricted to the form of bribing other senators, then there will still be a tug of war between conscience and monetary self-interest.

Since we are dealing with actual money, vote-buying is going to be particularly impactful on less well-off participants. This naturally means there would be a natural incentive for poor participants to join the tournament - for the promise of monetary prises. Just like how the poker game inevitably attracts the poor university student.

One might wonder, does one need to introduce a mechanism to enforce the promises of bribery? The answer is no. In fact, it absolutely should not be introduced. For if you do, then it eliminates the possibility of creating the culture of honour and promisekeeping. Furthermore, dishonest and lying bribe-offerers will likely be punished as the tournament progresses. Reiterated game theory dynamic secures it. If you cheated someone of a promised bribe, what are the chances you will maintain your standing in the tournament? Or in another tournament?

On the other hand, perhaps there is someone you really want to screw overeither because of personal vendetta or because of the repugnance of their views. In these case, one might be highly motivated to engage in treachery.

The capacity for treachery is something we should cultivate—even if its victims find it distasteful. Participants must internalize this, not only because treachery is an unavoidable feature of life, especially in high politics, but also because those with lofty ideals and ambitions will find it a dagger they cannot do without. If our goal is to foster a culture of trust and honour, as well as the capacity to betray and wound—like the Roman senators of old—then we must give participants the space to exercise both. Most importantly, the point is that a man is good not because he is weak and is unable to inflict pain, but because he is strong and is able to do harm, but choses not to do so. Si vis pacem, para bellum.

It is therefore no overstatement to say that bribery is the mother of honour in this game.

This begets an interesting question: why are bribes so frowned upon in modern electoral arena?

The most promising answer is that not all bribes are identical. The follow-up is that favour-trading is the equivalent of bribes that we described and enabled in our debate game - and that is never disallowed. Indeed, favour-trading is what politics is all about. If disallowed, politics disintegrates and ceases to be.

So why do we not allow the ordinary voter to sell his vote? Why do we not allow the rich to buy votes from the poor? It seems a very direct way to redistribute wealth, and certainly seems far better than the current system of wealth redistribution through government policy in areas of interest, or the electoral campaign phenomenon where the rich donates huge sums to candidates to either fatten their pockets or to fund their advertisement efforts. Neither the state nor the people are enriched in these transactions.

It seems particularly intuitive why enabling the buying of votes in parliament is not a good idea - it should seem too powerful a mechanism to reorganize interests - it's like staring directly into the sun. To emerge from intuition land, and get into something more rigourous, allowing the bribing of parliamentarians enable embezzlement and cronyism. Embezzlement take the following the form: the government, empowered by the bribed parliamentarian of transferring funds to a service provider whose service is purchased by the government. The parliamentarian then receives a bribe, either directly in the form of cash, or in the form of a kickback. The government is robbed.

The key mechanism is that the parliamentarian increased the price the government is willing to pay for the service than the government would have paid if

there was no bribe. The difference is then split between the service-provider and the bribe paid to the parliamentarian. The service-provider is enriched, the parliamentarian is enriched, and the government is impoverished.

Calling this embezzlement is probably mildly misleading in the sense it seems to suggest it occurs far less often than one would expect. In reality, this is just lobbying - and it undoubtedly happens every day.

Does this mechanism still manifest in some other form if it is the ordinary voter who's bribed, and not the parliamentarian? The voter merely elects the parliamentarian, but the parliamentarian doesn't get any kickbacks - the "kickback" is already spent on buying the votes from the voter, and for the vote-buyer to recuperate his expenditure, the parliamentarian must somehow spend government budget funds more extravagantly than he would have done otherwise on some service from the service-provider. Is the parliamentarian more, or less incentivized to do this, than he would have been if he was not bribed/lobbied?

### Nonchalant Speech

In the Roman Senatorial Debate, it is possible to run into local pockets of complete speech freedom, begotten by isolated game-theoretic dynamics. In these instances, senators find themselves in a position to speak whatever they want, without finding their standing in the tournament being in anyway diminished or damaged. If the initial vote is 7Y-1N, and the opposing senator is a penniless and charmless idiot, then one on the Yay side can speak whatever they want, and the other side cannot do anything about it.

This can also manifest in the outrounds. Since senators carry the points they accumulated from the preliminary rounds, the ones who've done really well could afford to say anything, or nothing, in perhaps a round or two in the outrounds - without still being punished.

Note that in the outrounds, a senator's speech carries greater weight, magnified by both their earned prestige and the attentiveness of a larger audience. If so, one can argue that the entire tournament is a platform for one to game and buy their way to be heard, particularly in the outrounds.

#### **Militants**

- Honour
- Motivations

Charm, multiround game theoretic dynamics, politics

#### Virtues bred

virtues bred

## **Intellectual Capture**

The debate tournament's potential for intellectual capture is under-appreciated. If appreciated, I shan't be suprised to see interested parties funding their own debate tournaments for ideological purposes.

The problem with the British Parliamentary format is not that it is open to intellectual capture. Its malaise is that (1) in theory, it is entirely captured by the core adjudicators and the body of judge, and (2) in practice, it is entirely captured by youthful idealism, which is naturally prone to levitate from reality, for there is no mechanical temperance by reality.

All forms of competitive or performative debate are open to intellectual and ideological capture. The Roman Senatorial Debate is no exception - but it is more prone to intellectual capture by ideologies informed by interest, and stakeholderhood.

How can the Roman Senatorial Debate be used to capture the intellectuals?

- motion setting - money -

The overton window.

I estimate, that it takes about 10 years for a debate motion to find its way into the public, national, political discourse.