

The Absurd Math of Accountability¹

How a precise calculation of voter accountability
reveals important flaws in transparency

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Accountability is often thought of as an essential part of a functioning democracy, but its mechanisms are poorly conceived. The notion that voters have control over their representatives' behavior is, for the most part, a mathematical impossibility. Indeed, by using simple math, based on a single known variable, we show that political parties, presidents and representatives legislate in a world almost entirely devoid of voter accountability. Indeed, the vast majority of issues are simply beyond a voter's reach. Further, we show that the introduction of transparency has virtually no effect on this near-zero voter accountability and instead yields substantial leverage to special interests. This results in a situation whereby increased transparency and accountability measures often exclusively benefit those in power. We introduce this math and discuss its implications for democracy, special interests, government capture and transparency reform.

¹ This paper is an early draft of a larger project and intended to support our claim that legislative accountability overwhelmingly benefits those in power. We have benefited from the thoughtful reflections of several colleagues, including Jenny Mansbridge, Jon Elster, Walter Oleszek, Bill Bianco, Bryan Hilderbrand and Scott Adler. We welcome – indeed we encourage – comments and suggestions.

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Voting ≠ Accountability

The central assumption of government transparency initiatives is that there exists a tight feedback loop between voters and representatives referred to as voter accountability. It is assumed that if a legislator acts in a way that is counter to the voters' wishes, transparent proceedings will bring this 'bad action' to the voters' attention and the legislator will be summarily punished at the polls. Behind this logic, governments (for the past fifty years) have increasingly opened their proceedings to the public. Tragically, this assumption of voter accountability is based on of an exceedingly poor understanding of the underlying math, and the implications for transparency reforms are stark.

As we know, for voter accountability to work as expected, there would need to be a way for voters to precisely weed out individual legislator actions, providing a carrot for all good legislative behavior and a stick for all the bad. But, as we will show, nothing could be further from reality. Indeed, while some observers refer to voting as a blunt instrument, few dig deeper to ask specifically "how blunt of an instrument is it?" It turns out that this 'bluntness' can be determined precisely without requiring empirical data on voter intentions or legislative outcomes. Instead we can calculate voter accountability accurately by looking at just one variable – the number of candidates in an election.

In the language of computers, a vote between two candidates holds a precise amount of information - one-bit. This is because, the voter can either vote for one candidate or the other.³ In computers and in real life, one-bit of information is the smallest amount of information there is, and in no way can it store a song (as a highly compressed mp3) or a picture (as a highly compressed jpeg) in recognizable form. Indeed, one-bit is too small to encode even one alphanumeric character, one musical note or one color. And at best, it might allow a voter to signal, say, whether they like conservatives or liberals, which is a simple, yet salient, binary choice.

But simple party-line voting, based on one-bit of information, provides no further resolution of the voter's intention.⁴ Once the party is chosen, all available information contained in the vote (one-bit) is used up, and no additional choices (or voter intentions) can be made. As such, in an election between two candidates, voter accountability is limited to one choice only.

³ We intentionally ignore the possibility of 'not voting' (abstention) as its incorporation complicates the discussion but doesn't significantly change our results or our argument.

⁴ Some might argue that party-line voting aggregates and aligns similar issues and thus makes an individual vote significantly more powerful. While this might be true in the particular, it is not necessarily true. And if a voter is presented with only two parties in an election, then that voter, through voting, cannot express their disagreement with either party on anything more specific than just the binary general notion of what the party claims to be (say 'liberal' or 'conservative'). Therefore, the math that we present in this paper, with respect to candidates, applies precisely to parties as well.

To address this problem, there are two ways to increase voter accountability (the amount of information voting can convey). The first way would be to embrace direct democracy and have the voter vote directly on each issue. By doing this, the voter would be able to express themselves on upwards of tens of thousands of different issues. Clearly, this would significantly increase the resolution of their intentions. But direct democracy, doesn't have a compelling history, as it introduces a number of nightmarish problems related to citizens' lack of attention, lack of voter turnout and the public's tendency to demand, simultaneously, both more services and less taxes, leading quickly to government bankruptcy.

The second way to increase the resolution of a vote would be to simply increase the number of candidates in an election. So, for example, instead of presenting voters with just two candidates, we could double the number of candidates to four. This would mean that the voter, casting one vote for any of the four candidates, would suddenly be able to express two-bits of information (assuming the candidates have sufficiently distinguished themselves from each other). And so by doubling the number of distinct candidates, we have doubled the amount of voter accountability.

But two-bits of information are still next to nothing. And, as we know from computers, two-bits are insufficient to distinguish any single alphanumeric character (this requires five-bits). In terms of our election, increasing voter accountability from one-bit to two-bits means the voter gets one additional choice. Instead of being limited to, say, just a choice between the conservative or liberal party, they might also get to decide ("yes" or "no") on whether the candidate is a good person. Importantly, however, after these two binary decisions are made, that's all the voter gets, as that's all the information that two-bits can convey. What this means, is that even with four candidates in an election, we have provided no voter accountability on a single substantive issue.

So, if we wish to provide voter accountability on actual issues (say, immigration policy, banking regulations, lobbying reform, climate legislation, genetically modified foods, economic policy, trade policy, health care, taxes on the wealthy, social security, and thousands of other issues) we need to double the amount of new candidates for every "yes" or "no" issue. And we thus need to increase the candidate space of every election, exponentially. Indeed, this can be represented by the expression 2^N , where N is the number of issues. And so for the electorate to express themselves (or hold their representative accountable) on just 10 "yes" or "no" issues, it would require an election with over one thousand distinct candidates in the race ($2^{10} = 1,024$). For 16 "yes" or "no" issues there would need to be over 65 thousand candidates ($2^{16} = 65,536$).

And while this might sound absurd, the numbers only get worse, as the above math assumes that the choices are unordered, binary decisions. If, instead, the voters prefer to focus on some issues instead of others (i.e. prioritize funding for certain programs over others), then we have to account for these voter preferences in our math. This means we would have to multiply the number of candidates by N factorial (N!), where N is, again, the number of binary, ordered issues that we hope to address, and the symbol '!' represents factorial math. This means that for 10 distinct (and binary) issues that reflect ordered preferences, the number of candidates in the

election would need to exceed 3.7 billion ($2^{10} \cdot 10! = 3.715$ billion). This means that to provide proper voter accountability on just the top ten issues, we would need an election where half the world's population were running as candidates. If we bump up the policy space to just 16 binary issues, the number of required candidates explodes to 1.3 quintillion. This is clearly impossible.

Further, most issues, like immigration or climate policy, are rarely decided with a binary, “yes” or “no” decision. So, for every level of increased complexity, scores of new candidates must be added to the election. For example, if there were just 20 possible alternatives on immigration reform, then the already absurd numbers of candidates (which we just found above) would have to be again multiplied by at least 20 (or more depending on ordered preferences etc.). Thus, we immediately run into a situation where voter accountability on even five nuanced issues, reflecting voter preferences would require the number of candidates in the election to be on the order of the number of stars in the sky.⁵ Thus, when an election presents itself with just a handful of candidates (or sometimes even just two candidates), we can quickly calculate the level of nuanced accountability a voter really has – and it is next to nothing.

The Voiceless Voter & The Special Interest

Let's look at an example based on a specific voter choosing between two candidates. Let's assume that the candidates (as they are wont to do) likely align with separate parties and, as such, differ significantly on a handful of major issues. Further, let's assume that the voter has already aligned with her party and her party's candidate because they tend to align with her positions on these big ticket items.

So when this voter finds out that her chosen candidate supports a minor amendment that, say, lowers the taxes on the wealthy by 0.02%, this may make her furious, but as long as she is more concerned about the major issues, there is nothing she can do – switching her vote to the other party or candidate would mean she would have to sacrifice her positions on all the major issues just to punish her candidate on this minor issue. This would be a fundamental mistake, and it indicates that she is entirely unable to hold her candidate accountable on the minor issue.

But this game of accountability flips for the powerful. And so for wealthy special interests, their leverage isn't limited to simple binary voting. Indeed, for the wealthy, this minor tax amendment could prove important, and, as a result, they might be willing to invest millions of dollars to push it through. But money works in ways that voting cannot, and the effects are far from binary. Indeed, a wealthy interest can deliver various amounts of cash to both candidates (or parties) at various times. Further they can link their actions to the specific legislative votes that address only this minor tax amendment. This means a wealthy special interest can pressure particular, minor

⁵ It is worth noting (though we leave it out of our one-variable calculation) that voter accountability is also further limited by the increasing number of voters. And so, for each additional voter in an election, individual voter accountability is diminished. As this additional math would only enhance our results, yet somewhat complicates the discussion, we have decided to leave this issue out.

amendments directly without having to sacrifice their positions on the major issues.⁶ So the accountability to moneyed interests works just the opposite of the way it works for voting. Thus, the more specific, obscure and precise the issue is, the easier it is for a wealthy interest to hold their member accountable.

Indeed, while a voter can only send one bit of information, a wealthy interest can send infinitely more. And so for the wealthy, and the wealthy alone, a representative democracy appears somewhat like an amped-up direct democracy. Instead of being hogtied by their lack of candidate choice, they can pressure hundreds (or even thousands) of minor issues with varying levels of intensity based on cash and intimidation. And unless an equally powerful civic minded special interest forms to combat the wealthy interest on each of these thousands of minor issues, the wealthy interests find themselves alone, applying influential pressure, and holding members accountable.

So instead of being a battle of democracy, legislation on the vast majority of issues becomes an arms race of power. There are those, like the wealthy interests, who are present in nearly committee hearing and markup, applying pressure on every line of the tax code, and there are those, like the poor who are not. And in any situation where the powerful group has more influence than the civic minded group, legislation will tend to favor the powerful. And this logic/math applies to tens of thousands of issues. Indeed, it applies to anything but the top two or three issues, resulting in a virtual menu of policy leverage for the wealthy, and an absolute accountability blind-spot for the voter.

This means that on issues as salient as climate change, health care, inequality or racial injustice, the candidates need offer the voter little more than lip service as they heed the calls of the interests. And as long as the heavenly chorus of special interests “sings with an upper class accent,” then we expect all legislation to favor them.

The Problem with Transparency

The effects of this problem however depend entirely on the level of transparency. Just not in the way we might think. Indeed, strong voter accountability is the key to all notions of government transparency, and the two ideas are often thought of in much the same way. But, this is a tragic mistake. In our math, the only dependent variable on voter accountability is the number of

⁶ Some might question what types of pressure a powerful special interest can apply. The options are extensive, and not all of them designed to change voters' minds on specific issues. For example, special interests can pressure with forms of bribery (financial incentives, gifts, future employment, approval of their cherished legislation, etc.) or forms of intimidation (attack ads, funding competitors, rejection of their cherished legislation, etc.). Importantly, the attack ads do not have to be topical, and so while an interest might want to change legislation on the tax code, they can pressure the legislator with attack ads focused on a candidate's sex life or other affiliations. Further, these special interests do not always have to be wealthy or American to be influential. They include Presidents, party leaders, Speakers, other members of Congress, foreign entities (i.e. pharmaceutical and oil companies), grass roots movements, lobbyists etc.

candidates the election, and we expect this accountability to be almost entirely unaffected by the levels or quality of transparency. Indeed (outside of an extreme case, where a major scandal might push a candidate's credibility into one of the top two or three dominant issues in the election) voter accountability remains ridiculously low regardless of how transparent the legislature is.⁷ This means that, despite what many scholars claim, the vast majority of transparent proceedings do nothing to increase accountability at all. And as long as a legislator can align themselves with one party and avoid looking like an absolute crook, their individual actions on nearly every substantive issue are entirely free from the wrath of the voters.

But, while increased transparency does little or nothing to increase voter accountability, it does, however, increase accountability more generally. And so, for example, if we make all the legislative votes transparent (a legislator often makes thousands of decisions each year), we are doing nothing to help voters, but we are significantly increasing the accountability legislators have toward special interests.

Therefore, because of transparency, the special interests get to apply pressure where voters cannot.

This math, then, requires a major rethinking of modern democratic principles, and, even though it tears apart the modern notions of transparency, it is not necessarily pessimistic. In fact, numerous recent studies have shown that while individual voters often make their candidate decisions using very little hard information, voters are often savvy judges of character. And their decision quality is often degraded not by the lack of information but instead by increased levels of information. Thus by cutting off this torrent of information from the voters (who rarely access government records anyway), we remove the essential (and likely corrosive) tie between special interests and legislators, but we don't necessarily degrade candidate choice.

Indeed, with Sweden as a rare modern example of a secretive legislature, we expect that reintroducing secrecy to a number of developed countries' legislatures would reverse modern trends of rising inequality and apparent government capture by powerful special interests. In short, secret legislatures are exponentially more democratic than transparent ones.

⁷ We tend to focus on legislatures because it is more difficult for an individual of the executive branch to embrace secrecy. This has everything to do with numbers. A President's decision is usually made by just President alone, and therefore, their veto or signing of legislation is a de facto transparent vote on a specific piece of legislation. As such, because they act alone, their actions are difficult to obscure. But a member of Congress or Parliament can vote secretly inside the legislature in such a way that it is nearly impossible (or simply impossible) for anyone to determine their individual vote. Therefore the powers of secrecy apply more readily (though not exclusively) to a legislature.

Appendix A

$$2^N * N!$$

Below we show the calculations of candidates required for precise accountability in both an unordered space of binary policy issues (2^N) and one where preferences matter ($2^N * N!$). For practicality, we limit ourselves to just 30 issues. Note that at 16 binary issues, we determine that the number of candidates for precise accountability would have to be on the order of the number of grains of sand on Earth. Few, if any issues are binary, and most legislatures decide on far more than 30 issues. This means that these already absurd numbers would have to increase substantially to account for reality.

#BinaryIssues	#Candidates Prefs Unordered	#Candidates Prefs Ordered	
X	Y	Z	
1	2	2	
2	4	8	
3	8	48	
4	16	384	
5	32	3,840	
6	64	46,080	46 thousand
7	128	645,120	
8	256	10,321,920	10 million
9	512	185,794,560	
10	1,024	3,715,891,200	3.7 billion
11	2,048	81,749,606,400	
12	4,096	1,961,990,553,600	1.9 trillion
13	8,192	51,011,754,393,600	
14	16,384	1,428,329,123,020,800	1.4 quadrillion
15	32,768	42,849,873,690,624,000	
16	65,536	1,371,195,958,099,970,000	1.3 quintillion
17	131,072	46,620,662,575,398,900,000	
18	262,144	1,678,343,852,714,360,000,000	
19	524,288	63,777,066,403,145,700,000,000	
20	1,048,576	2,551,082,656,125,830,000,000,000	
21	2,097,152	107,145,471,557,285,000,000,000,000	
22	4,194,304	4,714,400,748,520,530,000,000,000,000	
23	8,388,608	216,862,434,431,944,000,000,000,000,000	
24	16,777,216	10,409,396,852,733,300,000,000,000,000,000	
25	33,554,432	520,469,842,636,667,000,000,000,000,000,000	
26	67,108,864	27,064,431,817,106,700,000,000,000,000,000,000	
27	134,217,728	1,461,479,318,123,760,000,000,000,000,000,000,000	
28	268,435,456	81,842,841,814,930,500,000,000,000,000,000,000,000	
29	536,870,912	4,746,884,825,265,970,000,000,000,000,000,000,000,000	
30	1,073,741,824	284,813,089,515,958,000,000,000,000,000,000,000,000,000	