Elections

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April 11, 2020

1 Betting odds

If the betting odds are q/1, then for every dollar I spend, I will get q dollars back if I win.

$$\text{win} = E1 => \text{Payoff}(E1) = q$$
$$\text{lose} = E2 => \text{Payoff}(E2) = -1$$

Due to market equilibrium, the expectation of the bet is 0, meaning

$$0 = qp - (1-p) => p = \frac{1}{1+q}$$

Heard that there is 50/1 odds against Dwayne Johnson winning the 2020 elections. The implied winning probability of 2% is too high. My thought is that betting gives fatter tailed distributions as the gamblers are not rational and take more risks giving more weights to the outlier events.

2 Winner's bump

Suppose that the election winner X has a probability p of being voted while the losers Y have an aggregate probability $(1-p)$ of getting voted by the eligible citizens.
Let Z_t be the random variable representing the vote lead taken by the winner; while X_t and Y_t are the random variables representing the votes received by the winner and loser. Time is defined in such a way that at t_n, n chits have been read. Consequently,

$$X_{t_n} \sim Binomial(n, p) \tag{1}$$
$$Y_{t_n} \sim Binomial(n, 1-p) \tag{2}$$

Now, we compute the expectation of Z_t. Using linearity of expectation and (1),

$$\begin{aligned} E(Z_{t_n}) &= E(X_{t_n}) - E(Y_{t_n}) \\ &= np - n(1-p) \\ &= n(2p-1) \end{aligned}$$

Clearly, in an expected sense, we can see that the lead taken by the winner increases with time as more chits get tallied and they consolidate their wins.