

There are  $T$  votes for Trump and  $B$  votes for Biden.

There is  $e_t$  probability that a Trump vote will be wrongly counted as a Biden vote.

There is  $e_b$  probability that a Biden vote will be wrongly counted as a Trump vote.

let the expected number of Trump votes be:

$$\tau = T(1 - k_t) + Bk_b \quad (0.1)$$

$$\beta = B(1 - k_b) + Tk_t \quad (0.2)$$

## 1 PDF of trump votes

$$p(\tau = 0|T, V) = k_t^T(1 - k_b)^B \quad (1.1)$$

$$p(\tau = 1|T, V) = k_t^{T-1}(1 - k_t)(1 - k_b)^B + k_t^T k_t(1 - k_b)^{B-1} \quad (1.2)$$

$$p(\tau = 2|T, V) = k_t^{T-2}(1 - k_t)(1 - k_b)^B + k_t^T k_t(1 - k_b)^{B-2} + k_t^{T-1} k_t(1 - k_b)^{B-1} \quad (1.3)$$

$$(1.4)$$