Figure 1
Tree diagram of the trading process.

α is the probability of an information event, δ is the probability of a low signal, μ is the probability that the trade comes from an informed trader, 1/2 is the probability that an uninformed trader is a seller, and ε is the probability that the uninformed trader will actually trade. Nodes to the left of the dotted line occur only at the beginning of the trading day; nodes to the right are possible at each trading interval.
The probability of a buy, sell, or no-trade at any time during this day can be read off the good event branch of the tree in Figure 1. The probability of B buys, S sells, and N no-trades on a good event day is thus proportional to

\[ \text{Pr}\{B, S, N|\psi = H\} = [\mu + (1 - \mu)/2\varepsilon]^B[(1 - \mu)/2\varepsilon]^S[(1 - \mu)(1 - \varepsilon)]^N. \]  

(10)

Similarly, on a bad event day the probability of (B,S,N) is proportional to

\[ \text{Pr}\{B, S, N|\psi = L\} = [(1 - \mu)/2\varepsilon]^B[\mu + (1 - \mu)/2\varepsilon]^S[(1 - \mu)(1 - \varepsilon)]^N. \]  

(11)

Finally, on a day in which no event has occurred the probability of (B, S, N) is proportional to

\[ \text{Pr}\{B, S, N|\Psi = 0\} = [1/2\varepsilon]^{B+S}(1 - \varepsilon)^N. \]  

(12)
\[
\Pr\{B, S, N|\alpha, \delta, \mu, \varepsilon\} = \alpha(1 - \delta)[\mu + (1 - \mu)1/2(\varepsilon)]^B \\
\cdot [(1 - \mu)1/2(\varepsilon)]^S \cdot [(1 - \mu)(1 - \varepsilon)]^N \\
+ \alpha \delta[(1 - \mu)1/2(\varepsilon)]^B \cdot [\mu + (1 - \mu)1/2(\varepsilon)]^S \\
\cdot [(1 - \mu)(1 - \varepsilon)]^N \\
+(1 - \alpha)[1/2(\varepsilon)]^{B+S}(1 - \varepsilon)^N. \tag{13}
\]