Let $Y$ denote the number of steps in which your net profit is positive. Then $Y = Y_1 + Y_2 + \cdots + Y_n$, where $Y_k = 1$ if your net profit is positive at step $k$, and 0 otherwise.

Now, consider a particular step $k$. $Y_k = 1$ if and only if you have had more than $k/2$ steps in which your profit increased. Since the expected number of steps in which your profit increased is $k/3$, we can apply the Chernoff bound (4.1) with $\mu = k/3$ and $1 + \delta = 3/2$ to conclude that $EY_k$ is bounded by

$$\left[ \frac{e^{1/2}}{(3/2)^{3/2}} \right]^{(k/3)} \leq (.97)^k.$$ 

Thus,

$$EY = \sum_{k=1}^{n} EY_k < \sum_{k=1}^{n} (.97)^k < \frac{1}{1 - (.97)} < 34,$$

which is a constant independent of $n$.  

\footnote{ex251.139.906}