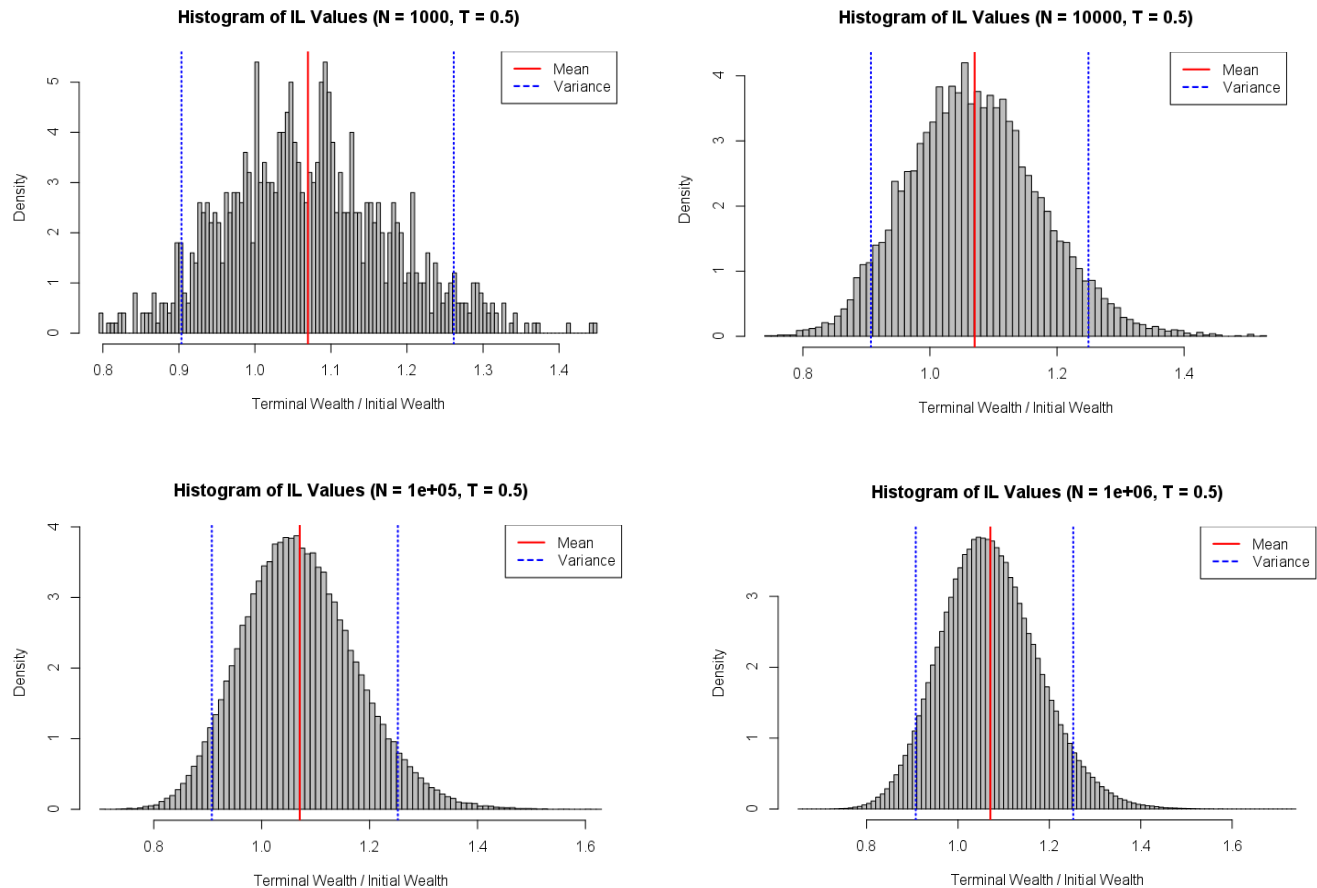


Monte Carlo Simulation Model for Portfolio Evaluation

For $T = 0.5$ and $N = (10^3, 10^4, 10^5, 10^6)$:

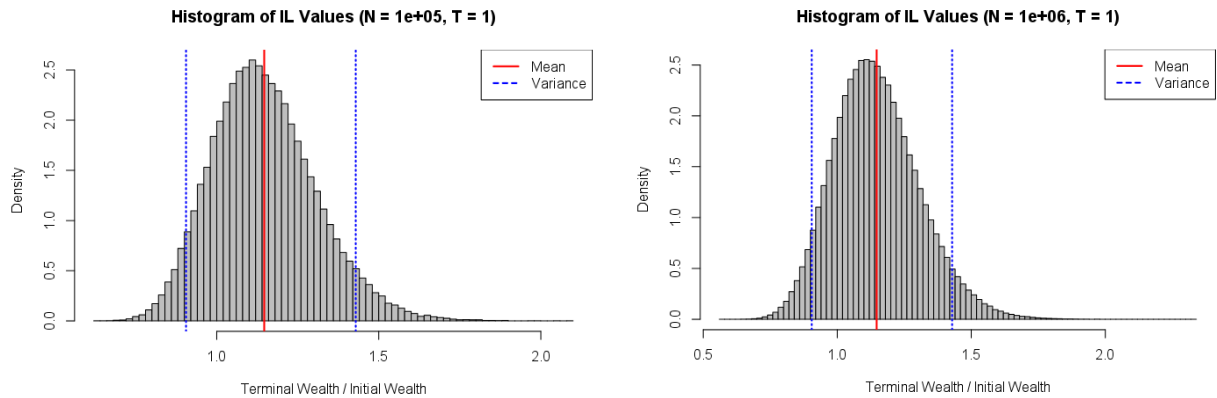


As the values of N (number of observations) increases, the graph gradually converges into a normal distribution curve and this is the general trend in all the graphs with varying values of T .

```
Year(s): 0.5 , N = 1000 , Estimated loss probability: 0.042 , Mean terminal wealth: 1.06979
Year(s): 0.5 , N = 10000 , Estimated loss probability: 0.0433 , Mean terminal wealth: 1.070455
Year(s): 0.5 , N = 1e+05 , Estimated loss probability: 0.0411 , Mean terminal wealth: 1.070614
Year(s): 0.5 , N = 1e+06 , Estimated loss probability: 0.041539 , Mean terminal wealth: 1.070997
```

The data shows how estimated loss probability smooths out and settles at 0.041 with mean also stabilizing at 1.070.

For $T = 1$ and $N = (10^3, 10^4, 10^5, 10^6)$:



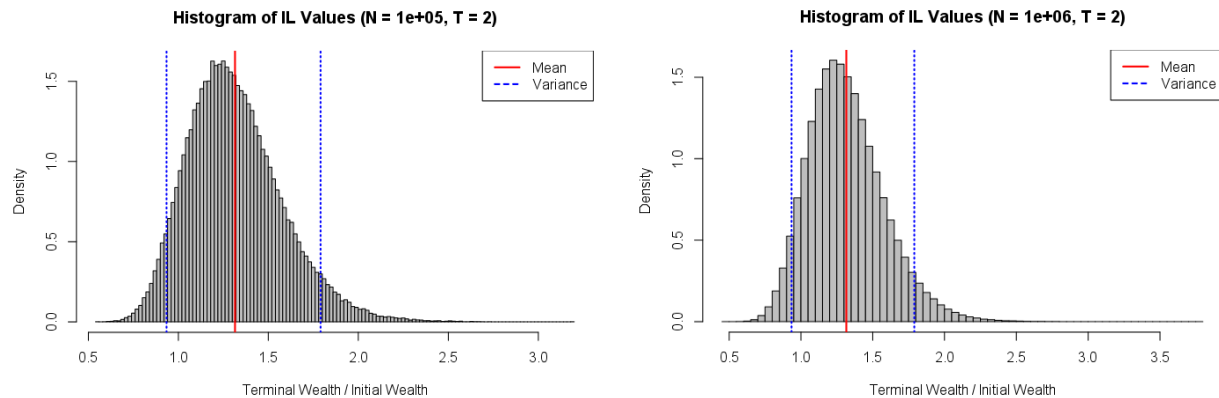
Following the general trend of increasing N values, the graph is a normal distribution curve, but we can see that the mean has shifted towards the right along with the 5th and 95th percentile.

```
Year(s): 1 , N = 1000 , Estimated loss probability: 0.045 , Mean terminal wealth: 1.145286
Year(s): 1 , N = 10000 , Estimated loss probability: 0.0486 , Mean terminal wealth: 1.146239
Year(s): 1 , N = 1e+05 , Estimated loss probability: 0.04514 , Mean terminal wealth: 1.146521
Year(s): 1 , N = 1e+06 , Estimated loss probability: 0.045959 , Mean terminal wealth: 1.147107
```

The data shows a general trend of mean wealth increasing while estimated loss probability decreasing as the year(s) increase.

This claim can be supported by further increasing the value of T and observing the changes.

For $T = 2$ and $N = (10^3, 10^4, 10^5, 10^6)$:



```
Year(s): 2 , N = 1000 , Estimated loss probability: 0.033 , Mean terminal wealth: 1.313244
Year(s): 2 , N = 10000 , Estimated loss probability: 0.0351 , Mean terminal wealth: 1.314638
Year(s): 2 , N = 1e+05 , Estimated loss probability: 0.03293 , Mean terminal wealth: 1.315202
Year(s): 2 , N = 1e+06 , Estimated loss probability: 0.032931 , Mean terminal wealth: 1.31616
```

The data and the graphs, again, show that the estimated loss probability is decreasing and the mean terminal wealth increases.

Hence, we can conclude that as the number of years is increased, the stock will have a general upwards trend with less instances of stock loss (which is the general idea of *Geometric Brownian Motion*) resulting in mean terminal wealth to increase.