Accounting for Financial and Managerial Decision and Control [AFMDC]

Unit 14
Investment Decision Under Condition of Risk and Uncertainty

Structure

- Investment decision under risk and uncertainty by using:
  - (i) Adjusted discount rate, certainty equivalent co-efficient, sensitivity and scenario analysis
  - (ii) Standard deviation, co-efficient of variation, probability distribution approach

After the completion of this unit, you should be able to:

- Understand the concepts of risk and uncertainty
- Analyze the risk under condition of uncertainty using: Adjusted discount rate, certainty equivalent co-efficient, sensitivity and scenario analysis
- Measure the risk by using different approaches: Standard deviation, co-efficient of variation, probability distribution approach

14.1 Concept of Risk and Uncertainty

Capital investment project should be less risky as possible as. To evaluate the capital investment project, there should be estimated future cash flows. The future is always uncertain. So, one of the basic requirements of capital investment decision making is to project all cash flows with a reasonable degree of accuracy.

There are three situations involved in returns in capital budgeting. They are:

i. Certainty

Certainty refers to a situation where the actual return on investment will be equal to the estimated return.

ii. Uncertainty

Under situation of uncertainty, the probability of a certain event occurred is unknown. When the future outcome cannot be predicted with any degree of confidence from a knowledge of past or existing events, that is known as a condition of uncertainty.

iii. Risk

It occurs where it is known what the future outcome will be, but where the various possible outcomes may be expected with some degree of confidence from the knowledge of past or existing events.

However, for the purpose of our study on the subject, we shall use the terms risk and uncertainty interchangeably and it will be referring to the situation of uncertain decision-making.

14.2 Measure of Risk

The risk involved in capital budgeting can be measured in absolute as well as relative terms. Absolute and relative measure of risk refers in terms of amount and percentage respectively. The following techniques are used for absolute measure of risk:

Sensitivity Analysis

It provides information regarding sensitive parameters of the proposed project to estimation error are like the expected cash flows, the discount rate and the life of the project. Sensitivity analysis uses a number of possible outcomes in its evaluation of a project and in this way, it takes care of estimation error. It provides to the decision-maker an insight into the variability of the outcomes.

Scenario Analysis

Scenario analysis the decision maker starts with three scenarios. Those are:

(a) Basic case scenario: It is the average scenario and assumes the average or normal benefit.

(b) Worst case scenario: It is estimation of the most serious or severe outcomes that may happen in worst situation.

(c) Best case scenario. This is the indeed projected scenario. It is an estimation of cash flows at the time of best situation.

The risk of the project is measured on the basis of the differences or gaps between NPV of search scenario.

Thus, the scenario analysis provides different cash flows estimates as possible outcomes associated with the project under the following three assumptions:

1. The Most Pessimistic (i.e. the Worst)
2. The Most Likely (i.e. the Expected), and
3. The Most Optimistic (i.e. the Best)

Standard Deviation

The difference between the possible cash flows that can occur and their expected value is obtained. The degree of risk present in a project is indicated by dispersion of cash flow. Standard deviation is most commonly used out of several measure of dispersion. Calculation of standard deviation is as follows:

$$\sigma = \sqrt{\Sigma\, dx^2 \,.\, p_j}$$

Where, σ = Standard Deviation

dx = Deviation of Cash Flow $(x-\bar{x})$; x Represent Cash Flow and $\bar{x}$ Represent mean of Cash Flow

P_j = Probability Occurrence of Cash Flow

dx^2 = Square of Deviation of Cash Flow $(x - \bar{x})^2$

iii. Coefficient of Variation

While comparing the uncertainty of alternative projects, the technique of standard deviation can be misleading in the event of the project’s differing initial cash outlay. In such a case, the best method to be used shall be the coefficient of variation. It is a measure of relative dispersion and can be calculated as under:

$$\text{Coefficient of Variation (C.V.)} = \frac{\text{Standard Deviation}}{\text{Expected Value}} \times 100$$

$$= \frac{\sigma}{\bar{x}} \times 100$$

The higher the coefficient of variation, the project is the riskier.

14.3 Risk Evaluation Approaches

After making the basis of risk and uncertainty, is required to quantify the risk and uncertainty in precise terms. The various techniques are used to handle the risk. They are:

1. Risk Adjusted Discount Rate Approach.
2. Certainty-equivalent Approach
3. Probability Distribution Approach

Risk Adjusted Discount Rate Approach

The risk-adjusted discount (RAD) rate approach is one of the simplest most widely used methods to incorporating risk into capital budgeting. In this method, it is assumed that "higher the rate of return, higher the risk is involved". This means the investors expect that when more risk is involved, more will be the return on investment. When less risk is involved less will be the return on investment. The risk-adjusted discount rate is:

RAD rate = Normal Rate or Risk-Free Rate + Risk Surplus or Risk Premium Rate

Certainty-equivalent Approach

Under this method, the estimated future cash flows are reduced to a conservative level by applying a correlation factor called "certainty-equivalent coefficient". So, the risk-adjusted factor is expressed in terms of a certainty-equivalent coefficient. It represents the relationship between the riskless cash flows and risky cash flows as below:

$$\text{Certainty-equivalent Coefficient} = \frac{\text{Riskless Cash Flow}}{\text{Risky Cash Flow}}$$

The risk-free rate is assumed to be constant for all periods. The certainty-equivalent coefficient varies inversely with risk and it assumes a value between 0 and 1. When greater risk is perceived, a lower certainty equivalent coefficient is used and accordingly when lower risk is anticipated, a higher certainty equivalent coefficient is used.

Probability Distribution Approach

Under, probability distribution approach, the use of probability theory in analyzing the risk of long-term investment decisions under two situations:

1. Independent Cash Flows Over Time (Uncorrelated Cash Flow) and
2. Dependent Cash Flows Over Time (Perfectly Correlated Cash Flow)

i. Independent Cash Flows Over Time (Uncorrelated Cash Flow)

Independent cash flow over time (uncorrelated cash flow) refers that the future cash flows are not affected by the cash flows in the preceding or following years. The standard deviation of the probability distribution of NPV is

$$\sigma_{NPV} = \sqrt{\frac{\sigma_1^2}{(1+i)^{2n}} + \frac{\sigma_2^2}{(1+i)^{2n}} + \frac{\sigma_3^2}{(1+i)^{2n}} + \ldots\ldots\ldots\ldots\ldots\ldots + \frac{\sigma_n^2}{(1+i)^{2n}}}$$

Where,

i = Risk Free Rate of Return

n = Number of Years

σ = Standard Deviation for each Year.

ii. Dependent Cash Flows Over Time (Perfectly Correlated Cash Flow)

When cash flows in one period depends upon the cash flows in previous period, they are referred to as dependent cash flows. The standard deviation of the probability distribution of NPV is

$$\sigma_{NPV} = \frac{\sigma_1}{(1+i)^1} + \frac{\sigma_2}{(1+i)^2} + \frac{\sigma_3}{(1+i)^3} + \ldots\ldots\ldots\ldots + \frac{\sigma_n}{(1=i)^n}$$

Special note: If the question is silenced regarding the independent or dependent cash flows over time then the cash flow of a given project is to be considered as independent.

Analysis Through Normal Probability Distribution

Using normal probability distribution, the decision-maker can have an idea of the probabilities of different expected values of NPV, i.e., the probability of NPV is being zero or less: the probability of NPV is being greater than zero: within the two values of NPV.

Knowledge of $\bar{x}_{NPV}$ (expected value of NPV or mean) and σ_{NPV} (standard deviation of NPV), the standardized may be referred as Z. The purpose of standardization is to transform the actual distribution of NPV into standard normal distribution and calculate the area under the probability distribution curve. The computation of Z and a normal probability distribution curve can be presented below:

$$Z = \frac{x_{NPV} - \bar{x}_{NPV}}{\sigma_{NPV}}$$

ILLUSTRATION 1

A company is considering bringing a new machine to increase its capacity. The machine has an initial cost of Rs.1,400. The finance department has developed the following discrete probability distribution for cash flows generated by the additional capacity during its service life of three years.

Year 1		**Year 2**		**Year 3**	
Cash Flow	**Probability**	**Cash Flow**	**Probability**	**Cash Flow**	**Probability**
200	0.10	300	0.15	100	0.20
400	0.20	600	0.20	300	0.30
600	0.50	900	0.40	600	0.40
800	0.20	1,000	0.25	900	0.10

Assuming the probability distributions of cash flows for future periods are independent (uncorrelated cash flow). The company's cost of capital is 12% and the company can invest in 6% treasury bills.

Required: (a) The expected monetary value (EMV) for each year.

(b) The expected net present value and decision regarding the proposal.
(c) The standard deviation of the cash flow for each year.
(d) The standard deviation of the net present value to measure the risk.
(e) If the total distribution is approximately normal and continuous,

i. What is the probability of NPV being zero or less?
ii. What is the probability of NPV being greater than zero?
iii. What is the probability of NPV is being less than Rs. 100?
iv. What is the probability of NPV is being more than Rs. 100?
v. What is the probability of NPV is being less than Rs. 300?
vi. What is the probability of NPV is being more than Rs. 300?
vii. What is the probability of NPV is being lies between Rs. 100 to Rs. 300?
viii. What is the probability of profitability index is being 1.5 or less?
ix. What is the probability of profitability index is being 1.5 or more?
x. What is the probability of NPV is being at least equal to mean?
xi. What is the probability of NPV is being 10% below mean?
xii. What is the probability of NPV is being 10% above mean?

SOLUTION:

(a) Calculation of the Expected Monetary Value (EMV) for each Year

Year 1			Year 2			Year 3		
Cash Flow	Probability	Expected Value	Cash Flow	Probability	Expected Value	Cash Flow	Probability	Expected Value
x	p_j	$x \times p_j$	x	p_j	$x \times p_j$	x	p_j	$x \times p_j$
200	0.10	20	300	0.15	45	100	0.20	20
400	0.20	80	600	0.20	120	300	0.30	90
600	0.50	300	900	0.40	360	600	0.40	240
800	0.20	160	1,000	0.25	250	900	0.10	90
Expected Value ($\bar{x}_1$)		= 560	Expected Value ($\bar{x}_2$)		= 775	Expected Value ($\bar{x}_3$)		= 440

(b) Calculation of the Expected Net Present Value

Years	**Expected Monetary Value (EMV)**	**Discount Factor @ 6%**	**Present Value**
1	560	0.943	528.08
2	775	0.890	689.75
3	440	0.840	369.60
Total Present Value			1,587.43
Less: Initial Net Cash Outlay (NCO)			1,400.00
Expected Net Present Value ($\bar{x}_{NPV}$)			187.43

Since, the expected net present value is become positive amounting Rs. 187.43, the proposal should be accepted.

(c) Calculation of the Standard Deviation of the Cash Flow for each Year

Year 1

Cash Flow (Rs.) x	Probability p_j	Expected Value $\bar{x}$	Deviation of Cash Flow $dx = (x - \bar{x})$	Deviations Squared $dx^2 = (x - \bar{x})^2$	Product of Probabilities and Squared Deviation $dx^2 \times p_j$
200	0.10	560	- 360	1,29,600	12,960
400	0.20	560	- 160	25,600	5,120
600	0.50	560	40	1,600	800
800	0.20	560	240	57,600	11,520
					$\Sigma dx^2\ p_j = 30,400$

$\sigma_1 = \sqrt{\Sigma\ dx^2 .\ p_j}$

$= \sqrt{30,400} = 174.36$ (Approx.)

Year 2

Cash Flow (Rs.) x	Probability p_j	Expected Value $\bar{x}$	Deviation of Cash Flow $dx = (x - \bar{x})$	Deviations Squared $dx^2 = (x - \bar{x})^2$	Product of Probabilities and Squared Deviation $dx^2 \times p_j$
300	0.15	775	- 475	2,25,625	33,843.75
600	0.20	775	- 175	30,625	6,125.00
900	0.40	775	125	15,625	6,250.00
1,000	0.25	775	225	50,625	12,656.25
					$\Sigma dx^2\ p_j = 58,875.00$

$\sigma_2 = \sqrt{\Sigma\ dx^2 .\ p_j}$

$= \sqrt{58,875} = 242.64$ (Approx.)

Year 3

Cash Flow (Rs.) x	Probability p_j	Expected Value $\bar{x}$	Deviation of Cash Flow $dx = (x - \bar{x})$	Deviations Squared $dx^2 = (x - \bar{x})^2$	Product of Probabilities and Squared Deviation $dx^2 \times p_j$
100	0.20	440	- 340	1,15,600	23,120
300	0.30	440	- 140	19,600	5,880
600	0.40	440	160	25,600	10,240
900	0.10	440	460	2,11,600	21,160
					$\Sigma dx^2\ p_j = 60,400$

$\sigma_3 = \sqrt{\Sigma\ dx^2 .\ p_j}$

$= \sqrt{60,400} = 245.76$ (Approx.)

(d) Calculation of the Standard Deviation of the Net Present Value under Assumption of Independent (Uncorrelated Cash Flow) Cash Flows Over Time

$$\sigma_{NPV} = \sqrt{\frac{\sigma_1^2}{(1+i)^{2n}} + \frac{\sigma_2^2}{(1+i)^{2n}} + \frac{\sigma_3^2}{(1+i)^{2n}} + \ldots\ldots\ldots\ldots + \frac{\sigma_n^2}{(1+i)^{2n}}}$$

$$= \sqrt{\frac{(174.36)^2}{(1+0.06)^{2\times1}} + \frac{(242.64)^2}{(1+0.06)^{2\times2}} + \frac{(245.76)^2}{(1+0.06)^{2\times3}}}$$

$$= \sqrt{\frac{(174.36)^2}{(1.06)^2} + \frac{(242.64)^2}{(1.06)^4} + \frac{(245.76)^2}{(1.06)^6}}$$

$$= \sqrt{27{,}057.14 + 46{,}633.86 + 42{,}578.19}$$

$$\sigma_{NPV} = \text{Rs. } 340.98$$

(e) Calculation of Probabilities:

Now, $\bar{x}_{NPV}$ = Rs. 187.43

σ_{NPV} = Rs. 340.98

$$= \frac{x_{NPV} - \bar{x}_{NPV}}{\sigma_{NPV}}$$

i. Probability of NPV being Zero or Less

$$Z = \frac{0 - 187.43}{340.98} = -0.55$$

Probability of NPV is being lies in between Rs. 0 to Rs. 187.43 ($\Rightarrow$ Z = -0.55 to Z = 0) = 0.2088

Probability of NPV is being zero or less = 0.50 – 0.2088 = 0.2912 = 29.12%.

ii. Probability of NPV being Greater than Zero

Probability of NPV is being greater than zero = 0.50 + 0.2088 = 0.7088 = 70.88%

iii. Probability of NPV is being Less than Rs. 100

$$Z = \frac{100 - 187.43}{340.98} = -0.26$$

Probability of NPV is being lies in between Rs. 100 to Rs. 187.43 ($\Rightarrow$ Z = -0.26 to Z = 0) = 0.1026

Probability of NPV is being less than Rs. 100 = 0.50 – 0.1026 = 0.3974 = 39.74%

iv. Probability of NPV is being more than Rs. 100

Probability of NPV is being more than Rs. 100 = 0.50 + 0.1026 = 0.6026 = 60.26%

v. Probability of NPV is being less than Rs. 300

$$Z = \frac{300 - 187.43}{340.98} = +33$$

Probability of NPV is being lies in between Rs. 187.43 to Rs. 300 (⇒ Z = 0 to Z = +0 33) = 0.1293

Probability of NPV is being less than Rs. 300 = 0.50 + 0.1293 = 0.6293 = 62.93%

vi. Probability of NPV is being than Rs. 300

Probability of NPV is being more than Rs. 300 = 0.50 - 0.1293 = 0.3707 = 37.07%

vii. Probability of NPV is being Lies between Rs. 100 to Rs. 300

$$Z = \frac{100 - 187.43}{340.98} = -0.26$$

$$Z = \frac{300 - 187.43}{340.98} = +33$$

Probability of NPV is being lies in between Rs. 100 to Rs. 187.43 (⇒ Z = -0.26 to Z = 0) = 0.1026

Probability of NPV is being lies in between Rs. 187.43 to Rs. 300 (⇒ Z = 0 to Z = +0 33) = 0.1293

Probability of NPV is being lies between Rs.100 to Rs. 300 = 0.1026 + 0.1293 = 0.2319 = 23.19%

viii. Probability of Profitability Index being 1.5 or less

$$\text{Profitability Index} = \frac{\text{Present Value of Future Cash Inflow after Tax}}{\text{Present Value of Initial Cash Outflow}}$$

$$\text{Profitability Index} = \frac{\text{NPV + NCO}}{\text{NCO}}$$

$$1.5 = \frac{\text{NPV + Rs. 1,400}}{\text{Rs. 1,400}}$$

NPV= Rs. 700

Now, $$Z = \frac{700 - 187.43}{340.98} = +1.50$$

Probability of NPV is being lies in between Rs. 187.43 to Rs. 700 (⇒Z = 0 to Z = + 1.50) = 0.4332

Probability of profitability index is being 1.5 or less = 0.50 + 0.4332 = 0.9332 = 93.32%

ix. Probability of Profitability Index is being 1.5 or more

Probability of profitability index is being 1.5 or more = 0.50 - 0.4332 = 0.0668 = 6.68%

x. Probability of NPV is being at Least equal to Mean

$$Z = \frac{187.43 - 187.43}{340.98} = 0.00$$

Probability of NPV is being lies in between Rs.187.43 to Rs.187.43 (⇒Z = 0.00 to Z =0.00) = 0.50

Probability of NPV is being at least equal to mean = 0.50 = 50%

xi. Probability of NPV is being 10% below Mean

$$Z = \frac{168.69 - 187.43}{340.98} = -0.05$$

Probability of NPV is being lies in between Rs.168.69 to Rs.187.43 (⇒Z =-0.05 to Z=0.00)=0.0199

Probability of NPV is being 10% below mean = 0.0199 = 1.99%

xii. Probability of NPV is being 10% above Mean

$$Z = \frac{206.17 - 187.43}{340.98} = +0.05$$

Probability of NPV is being lies in between Rs.187.43 to Rs.206.17 (⇒Z=0.00to Z=+0.05)=0.0199

Probability of NPV is being 10% above mean = 0.0199 = 1.99%

ILLUSTRATION 2

M/S Balazu Yantrasala is considering adding one more unit in its operation to produce solar rice cooker. The project will cost the company an investment Rs.20,000 and this will have a service life of three years. The company expects the following net cash benefits for the three years:

Year 1		Year 2		Year 3	
Net Cash Benefits (Rs.)	**Probability**	**Net Cash Benefits (Rs.)**	**Probability**	**Net Cash Benefits (Rs.)**	**Probability**
2,000	0.10	4,000	0.15	6,000	0.10
6,000	0.20	8,000	0.25	10,000	0.20
10,000	0.40	12,000	0.40	14,000	0.40
14,000	0.30	16,000	0.20	18,000	0.30

The expected cash flows have perfect correlation over time and company expects a minimum risk free rate of return of 10%.

Required:(a) The desirability of the project from NPV's point of view.

(b) The standard deviation of the probability distribution of net present values (assume normal distribution).

(c) The chances of NPV being zero or less and chances of being NPV more than Rs.10,000.

SOLUTION:

Calculation of Expected Monetary Value (EMV) for each Year

Year 1			Year 2			Year 3		
Cash Flow	**Probability**	**Expected Value**	**Cash Flow**	**Probability**	**Expected Value**	**Cash Flow**	**Probability**	**Expected Value**
x	**p_j**	**$x \times p_j$**	**x**	**p_j**	**$x \times p_j$**	**x**	**p_j**	**$x \times p_j$**
2,000	0.10	200	4,000	0.15	600	6,000	0.10	600
6,000	0.20	1,200	8,000	0.25	2,000	10,000	0.20	2,000
10,000	0.40	4,000	12,000	0.40	4,800	14,000	0.40	5,600
14,000	0.30	4,200	16,000	0.20	3,200	18,000	0.30	5,400
Expected Value ($\bar{x}_1$)		= 9,600	Expected Value ($\bar{x}_2$)		= 10,600	Expected Value ($\bar{x}_3$)		= 13,600

Calculation of the Expected Net Present Value

Years	Expected Monetary Value (EMV)	Discount Factor @ 10%	Present Value
1	9,600	0.909	8,726.40
2	10,600	0.826	8,755.60
3	13,600	0.751	10,213.60
Total Present Value			27,695.60
Less: Initial Net Cash Outlay (NCO)			20,000.00
Expected Net Present Value ($\bar{x}_{NPV}$)			7,695.60

Project Desirability

Since, the expected net present value is become positive amounting Rs. 7,695.60, the proposal should be accepted.

Calculation of the Standard Deviation of the Cash Flow for each Year

Year 1

Cash Flow (Rs.)	Probability	Expected Value	Deviation of Cash Flow	Deviations Squared	Product of Probabilities and Squared Deviation
x	p_j	$\bar{x}$	$dx = (x - \bar{x}) \div 1{,}000$	$dx^2 = (x - \bar{x})^2$	$dx^2 \times p_j$
2,000	0.10	9,600	- 7.6	57.76	5.776
6,000	0.20	9,600	- 3.6	12.96	2.592
10,000	0.40	9,600	0.4	0.16	0.064
14,000	0.30	9,600	4.4	19.36	5.808
					$\Sigma dx^2\ p_j = 14.240$

$$\sigma_1 = \sqrt{\Sigma\, dx^2 . p_j} \times 1{,}000$$

$$= \sqrt{14.240} \times 1{,}000 = 3{,}773.59$$

Year 2

Cash Flow (Rs.)	Probability	Expected Value	Deviation of Cash Flow	Deviations Squared	Product of Probabilities and Squared Deviation
X	p_j	$\bar{x}$	$dx = (x - \bar{x}) \div 1{,}000)$	$dx^2 = (x - \bar{x})^2$	$dx^2 \times p_j$
4,000	0.15	10,600	- 6.6	43.56	6.534
8,000	0.25	10,600	- 2.6	6.76	1.690
12,000	0.40	10,600	1.4	1.96	0.784
16,000	0.20	10,600	5.4	29.16	5.832
					$\Sigma dx^2\ p_j = 14.840$

$\sigma_2 = \sqrt{\Sigma\, dx^2 . p_j} \times 1,000$

$= \sqrt{14.840} \times 1,000 = 3,852.27$

Year 3

Cash Flow (Rs.)	Probability	Expected Value	Deviation of Cash Flow	Deviations Squared	Product of Probabilities and Squared Deviation
x	$\mathbf{p_j}$	$\bar{x}$	$dx = (x-\bar{x}) \div 1,000$	$dx^2 = (x-\bar{x})^2$	$dx^2 \times p_j$
6,000	0.10	13,600	- 7.6	57.76	5.776
10,000	0.20	13,600	- 3.6	12.96	2.592
14,000	0.40	13,600	0.4	0.16	0.064
18,000	0.30	13,600	4.4	19.36	5.808
					$\Sigma dx^2\ p_j = 14.240$

$\sigma_3 = \sqrt{\Sigma\, dx^2 . p_j} \times 1,000$

$= \sqrt{14.240} \times 1,000$

$= 3,773.59$

Calculation of the Standard Deviation of the Net Present Value under Assumption of Dependent (Perfect Correlated) Cash Flows Over Time

$$\sigma_{NPV} = \frac{\sigma_1}{(1+i)^1} + \frac{\sigma_2}{(1+i)^2} + \frac{\sigma_3}{(1+i)^3} + \ldots\ldots\ldots\ldots + \frac{\sigma_n}{(1+i)^n}$$

$$= \frac{3,773.59}{(1+0.10)^1} + \frac{3,852.27}{(1+0.10)^2} + \frac{3,773.59}{(1+0.10)^3}$$

$= 3,430.54 + 3,183.69 + 2,835.15$

$\sigma_{NPV} = 9,449.38$

Calculation of Probabilities

Now, $\bar{x}_{NPV}$ = Rs. 7,695.60

σ_{NPV} = Rs. 9,449.38

$$Z = \frac{x_{NPV} - \bar{x}_{NPV}}{\sigma_{NPV}}$$

Probability of NPV is being Zero or Less

$$Z = \frac{0 - 7,695.60}{9,449.38}$$

$= -0.81$

Probability of NPV is being lies in between Rs. 0 to Rs. 7,695.60 ($\Rightarrow$ Z = -0.81 to Z = 0) = 0.2910

Probability of NPV is being zero or less = 0.50 – 0.2910 = 0.2090 = 20.90%

Probability of NPV is being more than Rs. 10,000

$$Z = \frac{10,000 - 7,695.60}{9,449.38}$$

$= +0.24$

Probability of NPV is being lies in between Rs. 7,695.60 to Rs. 10,000 ($\Rightarrow$ Z = 0 to Z = + 0.24) = 0.0948

Probability of NPV is being more than Rs. 10,000 = 0.50 – 0.0948 = 0.4052 = 40.52%

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