8_feb_finance_lab_DA1

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2.1 Digital Assignment-Financial Analytics

2.2 Winter 2024-25

2.3 Q1:

2.3.1 Design a portfolio for a person aged 40 with an initial corpus of 10000000. He has the following goals: at the age of 42 he needs 2000000 and he needs 50,00000 at the age of 48. Also, he has a monthly SIP of 20,000. calculate the retirement corpus at the age of 60 by assuming the debt interest rate of 6% per annum and equity interest rate of 14% per annum. Provide the solution using MS excel sheet. Also generate a python code for the same.

2.4 Initial Parameters

[13]:
```
initial_corpus = 10000000
p_eq = initial_corpus / 2  # 50% in equity
p_dt = initial_corpus / 2  # 50% in debt
r_eq = 0.14  # Equity return rate
r_dt = 0.06  # Debt return rate
monthly_sip = 20000
retirement_age = 60
initial_age = 40
```

2.5 Function to calculate SIP corpus

[14]:
```
def sip_corpus(monthly_investment, rate, years):
    annual_investment = monthly_investment * 12
    amount = 0
    for _ in range(years+1):
        amount = (amount + annual_investment) * (1 + rate)
    return amount
```

2.6 Function to calculate debt/equity returns with compound interest

[15]:
```
def future_value(principal, rate, time):
    return principal * (1 + rate) ** time
```

[16]:
```
# Computing corpus at age 42 after withdrawal of  20,00,000
amount_42 = future_value(p_dt, r_dt, 2) - 2000000

# Computing corpus at age 48 after withdrawal of  50,00,000
amount_48 = future_value(amount_42, r_dt, 6) - 5000000

# Computing corpus at age 58 from all sources
amount_58 =(
    future_value(amount_48, r_eq, 10) +  # Growth of remaining debt corpus by␣
 ↪putting in equity
    future_value(p_eq, r_eq, 18) +  # Growth of initial equity corpus
    sip_corpus(monthly_sip, r_eq, 18)  # SIP accumulation
)

# Putting the entire corpus in debt for 2 years to avoid volatility
retirement_corpus = future_value(amount_58, r_dt, 2)

# Display Result in Indian Number Format
import locale # for Indian number formatting
# Set locale to Indian format
locale.setlocale(locale.LC_ALL, 'en_IN')
# Print the amount in Indian format
formatted_amount = locale.format_string(" %.2f", retirement_corpus,␣
 ↪grouping=True)

print(f"At the age of 60, he can retire with a corpus of:{formatted_amount}")
```

```
At the age of 60, he can retire with a corpus of:  8,42,38,461.87
```

2.7 Q2.

2.7.1 Design a portfolio for a person aged 40 with an initial corpus of 10000000. He has the following goals:

- at the age of 42 he needs 2000000 and
- he needs 50,00000 at the age of 48. ### The portfolio needs to be created by using investments in Future and index fund. Calculate the retirement corpus at the age of 60 by assuming the index fund interest rate of 14% per annum and the bet on strike price of the Future is 2% per month. Also , it is assumed that the wining bet is 9 times in a year for Future. Provide the solution using MS excel sheet. Also generate a python code for the same.

2.8 Initial Parameters

[17]:
```
initial_corpus = 10000000  # 1 Crore
p_future = 2000000  # 20L in Future investment
p_eq = initial_corpus - p_future  # Remaining in Equity
r_eq = 0.14  # Index Fund return (14% p.a.)
r_future = 0.18  # Effective annual return from Future (18% p.a.) as 9 out of␣
↪12 times is winning bet
retirement_age = 60
initial_age = 40
```

2.9 Function to calculate future value with compound interest

[18]:
```
def future_value(principal, rate, time):
    return principal * (1 + rate) ** time
```

[19]:
```
# Computing corpus at age 42 after Future investment
amount_42_future = future_value(p_future, r_future, 2)
amount_42 = amount_42_future - 2000000  # Withdrawal at age 42
amount__47 = future_value(amount_42, r_eq, 5)  # Invest in Equity for 5 years

amount_48_future = future_value(amount__47, r_future, 1)

# equity investment for 8 years till age 48
amount_eq_48 = future_value(p_eq, r_eq, 8)

# Total corpus at 48 after taking out 50 lakhs
amount_48_total = amount_48_future+amount_eq_48 - 5000000  # Withdrawal of 50␣
↪lakhs at age 48

# Equity investment for 12 years till age 60
amount_60 = future_value(amount_48_total, r_eq, 12)

# Display Result in Indian Number Format
import locale # for Indian number formatting
# Set locale to Indian format
locale.setlocale(locale.LC_ALL, 'en_IN')
# Print the amount in Indian format
formatted_amount = locale.format_string(" %.2f", amount_60, grouping=True)

print(f"At the age of 60, he can retire with a corpus of:{formatted_amount}")
```

```
At the age of 60, he can retire with a corpus of:  9,44,48,994.42
```