Present Value and Future Value

# Abstract

The purpose of this exercise is to calculate the present value and future value of an investment. The calculation will determine if it is a “Good Investment” or “Bad Investment” based on the revenue the investment will generate.

# Problem Statement

Do we want to make the right choice? By using the present value and future value equations we can make a mathematical determination if an investment will be worth it after a given timeframe. The main variables to calculate this will be: cash, rate, nper, pmt, and fv.

# Methodology

Utilizing Python and the numpy library the problem was solved relatively fast and painless. There are four main sections to the program; a while loop, the input, for loop, and output. The output is a custom function that takes all the variables and outputs them in a pleasing manner. A while loop holds the initial question and will run indefinitely based on the user’s feedback. A for loop will loop though the assignment arrays outputting the results. The following code is the final product used within the problem.

'''

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Present Value

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Variables:

cash - What you have

rate - Intreset Rate per period

nper - Number of compounding periods

pmt - Payment(Revenue Generated)

fv - Future value

np.pv() - Present Value

np.fv() - Future Value

'''

import numpy\_financial as np

cash = [10000, 9000, 5000, 3000, 0]

pmt = [500, 600, 1000, 1200, 1500]

rate = 0.05

nper = 10

continue\_yn='y'

question = 'ask'

def investmentGB(pv, fv):

if pv > fv:

investment = "Bad Investment"

elif pv < fv:

investment = "Good Investment"

print()

print(f'The Future Value:$ {fv:.2f}')

print(f'The Present Value:$ {pv:.2f}')

print()

print(investment)

print()

print('\*'\*50)

while continue\_yn=='y':

if question == 'ask':

question = input('Do you wish to (M)anually Calculate your PV & FV, or run the (A)ssignment Numbers (M or A)?').upper()

if question == 'M':

print()

cash = float(input('Enter in the Original Price: '))

rate = float(input("Enter in the Intreset Rate (i.e. 5% is 0.05): "))

nper = float(input("Enter in the Number of Years: "))

pmt = float(input("Enter in the Yearly Revenue: "))

pv = np.pv(rate, nper, 0, -cash)

fv = np.fv(rate, nper, -pmt, pv)

print('\*'\*50)

print(f'Intial Investment:$ {cash}')

print(f'Intrest Rate: {rate\*100}%')

print(f'Revenue:$ {pmt}')

print(f'Number of Periods: {nper}')

investmentGB(pv, fv)

print()

continue\_yn = input('Do you wish to continue? (Y or N)').lower()

print()

elif question == 'A':

for (i, j) in zip(cash, pmt):

pv = np.pv(rate, nper, 0, -i)

fv = np.fv(rate, nper, -j , pv)

print('\*'\*50)

print(f'Intial Investment:$ {i}')

print(f'Intrest Rate: {rate\*100}%')

print(f'Revenue:$ {j}')

print(f'Number of Periods: {nper}')

investmentGB(pv, fv)

break

# Solution

The following assignment variables provided below in the table with an investment and revenue, with the python output. When the code is run you will be asked to either Manually enter the Variables or run the Assignment Variables using the choice ‘M’ or ‘A’.

Table : Investment Variables

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Investment** | **Interest Rate** | **Periods** | **Revenue** | **Future Value** | **Present Value** | **Investment Good or Bad** |
| $10000 | 5% | 10 | $500 | $-3711.05 | $6139.13 | Bad |
| $9000 | 5% | 10 | $600 | $-1453.26 | $5525.22 | Bad |
| $5000 | 5% | 10 | $1000 | $7577.89 | $3069.57 | Good |
| $3000 | 5% | 10 | $1200 | $12093.47 | $1841.74 | Good |
| $0 | 5% | 10 | $1500 | $18866.84 | $0.00 | Good |

# Conclusion

The present values is explained as a sum of money that will have a future value based on compounded interest, while future value is the value of an asset at a specific date. The main relationship is figuring out the future return of our investment based on an interest rate and time. Utilizing the present value and future value of an investment can allow us to make better choices when looking at future investments.