

Module 04 – Multiperiod Modeling

Exploratory Data Analysis

In this section, you should perform some data analysis on the data provided to you. Please format your findings in a visually pleasing way and please be sure to include these cuts:

- Make a nicely formatted table with the needed data on each investment

Investment	Return	Inflow	Outflow
Caramelized Capital	1.99%	1	1
Gumball Growth Group	4.22%	1	2
Licorice Leverage Group	6.45%	2	3
LuxeLollipop Asset Management	8.71%	3	4
Marshmallow Margin Group	10.94%	1	5

Model Formulation

Write the formulation of the model into here prior to implementing it in your Excel model. Be explicit with the definition of the decision variables, objective function, and constraints

Caramelized Capital	A
Gumball Growth Group	B
Licorice Leverage Group	C
LuxeLollipop Asset Management	D
Marshmallow Margin Group	E

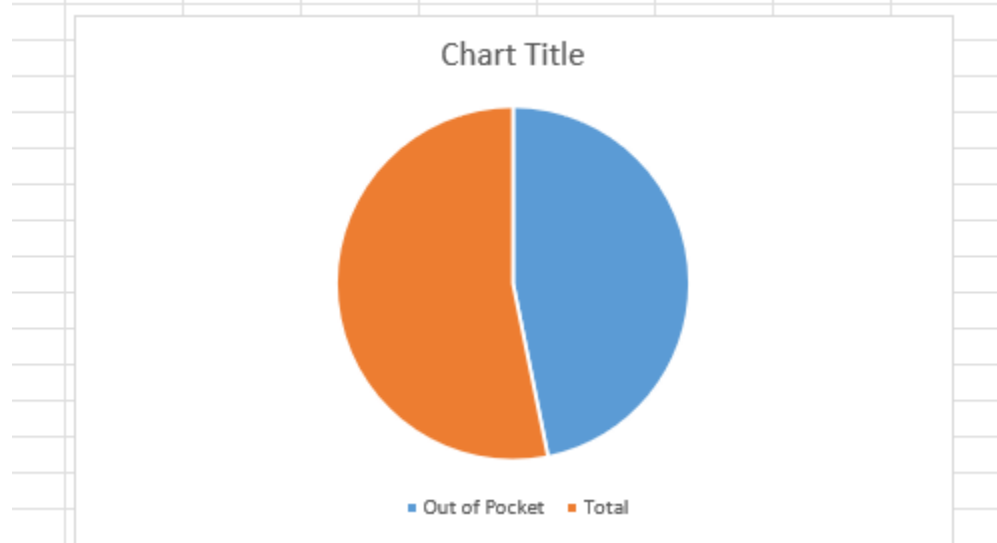
- Min: $A_1 + B_1 + C_1 + D_1 + E_1$
 - o A_i = amount (in 1000s) placed in investment A at the beginning of month $i = 1, 2, 3, 4, 5, 6, 7, 8, 9$
 - o B_i = amount (in 1000s) placed in investment A at the beginning of month $i = 1, 3, 5, 7$
 - o C_i = amount (in 1000s) placed in investment A at the beginning of month $i = 2, 5$
 - o D_i = amount (in 1000s) placed in investment A at the beginning of month $i = 3$
 - o E_i = amount (in 1000s) placed in investment A at the beginning of month $i = 1$
- Constraints – Starting month 2
 - o $1.0199A_1 - 1A_2 - 1C_2 = 0$
 - o $1.0422B_1 + 1.0199A_2 - 1A_3 - 1B_3 - 1D_3 = 250$
 - o $1.0199A_3 - A_4 = 0$
 - o $1.0645C_2 + 1.0422B_3 + 1.0199A_4 - 1A_5 - 1B_5 - 1C_5 = 0$
 - o $1.1094E_1 + 1.0199A_5 - 1A_6 = 250$
 - o $1.0871D_3 + 1.0422B_5 + 1.0199A_6 - 1A_7 - 1B_7 = 0$
 - o $1.0645C_5 + 1.0199A_7 - 1A_8 = 0$

- $1.0422B7 + 1.0199A8 - 1A9 = 0$
- $1.0199A9 = 500$

Model Optimized for Least Cost out of Pocket

Implement your formulation into Excel and be sure to make it neat. This section should include:

- A screenshot of your optimized final model (formatted nicely, of course)
- A text explanation of what your model is recommending
- Add some sort of visualization. Some ideas:
 - A pie chart or stacked bar chart to compare money out of pocket vs end amount



- A line chart to show either current amount or cumulative amount invested in each investment
- Any other solution you may have

Investment	Inflow	Outflow	Amount	Return	1	2	3	4	5	6	7	8	9	10
Caramelized Capital	1	2	\$ -	1.99%	-1	1.0199								
Gumball Growth Group	1	3	\$ 655.06	4.22%	-1	<--->	1.0422							
Marshmallow Margin Group	1	6	\$ 225.35	10.94%	-1	<--->	<--->	<--->	<--->	1.1094				
Caramelized Capital	2	3	\$ -	1.99%	-1	1.0199								
Licorice Leverage Group	2	5	\$ -	6.45%	-1	<--->	<--->	1.0645						
Caramelized Capital	3	4	\$ -	1.99%		-1	1.0199							
Gumball Growth Group	3	5	\$ -	4.22%		-1	<--->	1.0422						
LuxeLollipop Asset Management	3	7	\$ 432.70	8.71%		-1	<--->	<--->	<--->	1.0871				
Caramelized Capital	4	5	\$ -	1.99%			-1	1.0199						
Caramelized Capital	5	6	\$ -	1.99%				-1	1.0199					
Gumball Growth Group	5	7	\$ -	4.22%				-1	<--->	1.0422				
Licorice Leverage Group	5	8	\$ -	6.45%				-1	<--->	<--->	1.0645			
Caramelized Capital	6	7	\$ -	1.99%					-1	1.0199				
Caramelized Capital	7	8	\$ -	1.99%						-1	1.0199			
Gumball Growth Group	7	9	\$ 470.39	4.22%						-1	<--->	1.0422		
Caramelized Capital	8	9	\$ -	1.99%							-1	1.0199		
Caramelized Capital	9	10	\$ 490.24	1.99%								-1	1.0199	
Amount in month 1 ---->			\$ 880.41		Surplus Funds	\$ -	\$ 250.00	\$ -	\$ -	\$ 250.00	\$ -	\$ -	\$ -	\$ 500.00
					Req'd Payments	\$ -	\$ 250.00	\$ -	\$ -	\$ 250.00	\$ -	\$ -	\$ -	\$ 500.00

- With this investment strategy, my model recommendation is saving around 120,000 dollars. If we were to just pay with no investments the costs would be much higher

Model with Stipulation

Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution.

Try one of these 2 scenarios:

- *If we remove the midterm payments and instead pay the entirety at the end of the time period, does your model change at all? If so, why may there be a change?*
- *An investor normally tries to not be oversubscribed/overexposed to one single investment. Can you add a constraint to your model to limit the amount of exposure in any single investment and describe how the model has changed?*

I chose the first scenario. Yes, the model changes when the midterm payment is moved to the end of the time period. If we remove the midterm payments, the model has more flexibility in how it invests money. This means it can invest in more high return options early on which will grow over a longer period. Before, the model had to make sure there was enough money available in the middle months to meet payment requirements, which limited how much could be invested long term. With one big payment at the end, the model does not need to save money for earlier expenses so it can take advantage of compounding returns over the full period.