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*

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

MIN (yr1 Investment): A1 + B1 + E1

Constraints:

Year 2: 1.0199A1 – 1A1 -1C2 =0

Year 3: 1.0422B1 + 1.0199A2 – 1A3 – 1B3 -1D3 = 250

Year 4: 1.0199A3 – 1A4 = 0

Year 5: 1.0644C2 + 1.0422B3 + 1.0199A4 – 1A5 – 1B5 – 1C5 = 0

Year 6: 1.1094E1 + 1.0199A5 – 1A6 = 250

Year 7: 1.0868D3 + 1.0422B5 + 1.0199A6 -1A7 -1B7 = 0

Year 8: 1.0644C5 + 1.0199A7 – 1A8 = 0

Year 9: 1.0422B7 + 1.0199A8 – 1A9 = 0

Year 10: 1.0199A9 = 500

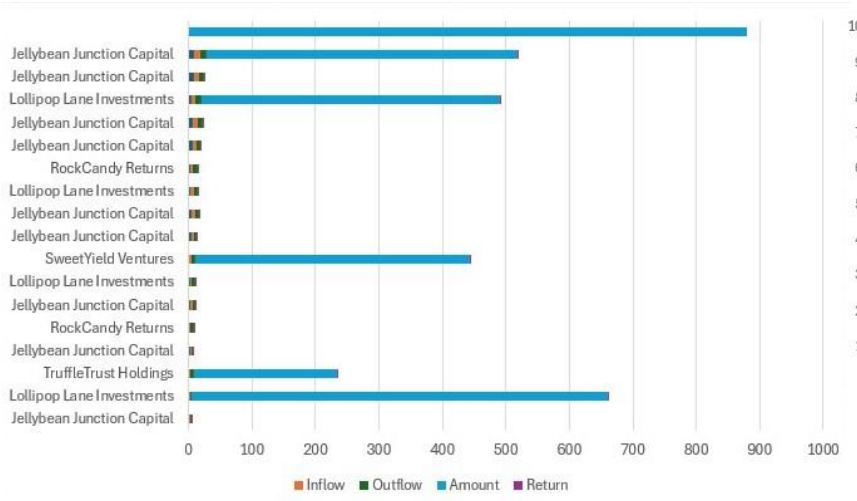
Model Optimized for Least Cost out of Pocket

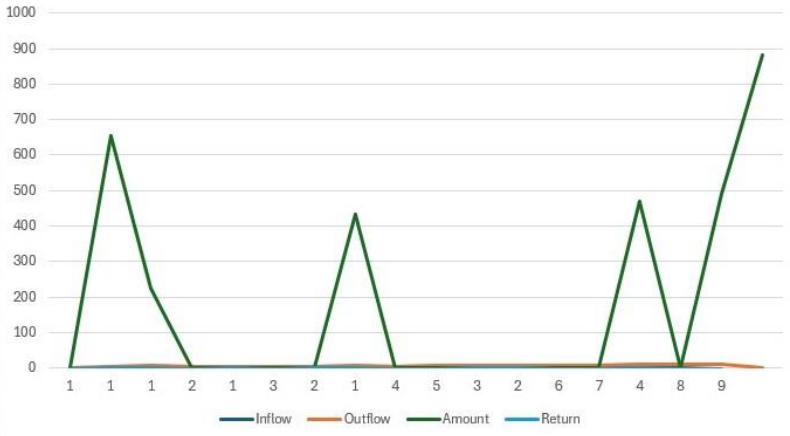
Implement your formulation into Excel and be sure to make it neat. This section includes:

- *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
Jellybean Junction Capital	1	1	2	0	1.99%	-1	1.0199								
Lollipop Lane Investments	1	1	3	655.176	4.22%	-1	<--->	1.0422							
TruffleTrust Holdings	1	1	6	225.347	10.94%	-1	<--->	<--->	<--->	<--->	1.1094				
Jellybean Junction Capital	2	2	3	0	1.99%		-1	1.0199							
RockCandy Returns	1	2	5	0	6.44%		-1	<--->	<--->	1.0644					
Jellybean Junction Capital	3	3	4	0	1.99%			-1	1.0199						
Lollipop Lane Investments	2	3	5	0	4.22%			-1	<--->	1.0422					
SweetYield Ventures	1	3	7	432.8244	8.68%			-1	<--->	<--->	<--->	1.0868			
Jellybean Junction Capital	4	4	5	0	1.99%				-1	1.0199					
Jellybean Junction Capital	5	5	6	0	1.99%					-1	1.0199				
Lollipop Lane Investments	3	5	7	0	4.22%					-1	<--->	1.0422			
RockCandy Returns	2	5	8	0	6.44%					-1	<--->	<--->	1.0644		
Jellybean Junction Capital	6	6	7	0	1.99%						-1	1.0199			
Jellybean Junction Capital	7	7	8	0	1.99%							-1	1.0199		
Lollipop Lane Investments	4	7	9	470.3935	4.22%							-1	<--->	1.0422	
Jellybean Junction Capital	8	8	9	0	1.99%								-1	1.0199	
Jellybean Junction Capital	9	9	10	490.2441	1.99%									-1	1.0199
			Total	**880.523**		**surplus funds**	0	250	0	0	250	0	0	0	500
						required payments	0	$ 250.00	$ -	$ -	$ 250.00	$ -	$ -	$ -	$ 500.00

Investment		start inves	Matures	Return of Maturity
Jellybean Junction Capital		1	1	1.99%
Lollipop Lane Investments		1	2	4.22%
RockCandy Returns		2	3	6.44%
SweetYield Ventures		3	4	8.68%
TruffleTrust Holdings		1	5	10.94%





The model recommends investing in a mix of options that provide returns at the right times to cover required payments. It spreads investments across different funds to match inflows with outflows, minimizing the need for extra cash. This approach aims to reduce total out-of-pocket expenses while maximizing returns.

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?*

Solver with stipulation took away surplus funds and required payments which just spanned out the increments and consolidated more. The updated model also shifts more funds to SweetYield Ventures and Jellybean Junction Capital, likely due to their favorable returns over the long term. This version fully covers the final $1000 required payment without surplus funds left over, indicating a tighter match between inflows and required payments

Investment		Inflow	Outflow	Amount	Return	1	2	3	4	5	6	7	8	9	10
Jellybean Junction Capital	1	1	2	0	1.99%	-1	1.0199								
Lollipop Lane Investments	1	1	3	0	4.22%	-1	<--->	1.0422							
TruffleTrust Holdings	1	1	6	0	10.94%	-1	<--->	<--->	<--->	<--->	1.1094				
Jellybean Junction Capital	2	2	3	0	1.99%		-1	1.0199							
RockCandy Returns	1	2	5	0	6.44%		-1	<--->	<--->	1.0644					
Jellybean Junction Capital	3	3	4	0	1.99%			-1	1.0199						
Lollipop Lane Investments	2	3	5	0	4.22%			-1	<--->	1.0422					
SweetYield Ventures	1	3	7	865.6488	8.68%			-1	<--->	<--->	<--->	1.0868			
Jellybean Junction Capital	4	4	5	0	1.99%				-1	1.0199					
Jellybean Junction Capital	5	5	6	0	1.99%					-1	1.0199				
Lollipop Lane Investments	3	5	7	0	4.22%					-1	<--->	1.0422			
RockCandy Returns	2	5	8	0	6.44%					-1	<--->	<--->	1.0644		
Jellybean Junction Capital	6	6	7	0	1.99%						-1	1.0199			
Jellybean Junction Capital	7	7	8	0	1.99%							-1	1.0199		
Lollipop Lane Investments	4	7	9	940.7871	4.22%							-1	<--->	1.0422	
Jellybean Junction Capital	8	8	9	0	1.99%								-1	1.0199	
Jellybean Junction Capital	9	9	10	980.4883	1.99%									-1	1.0199
			Total	0		surplus funds	0	0	0	0	0	0	0	0	1000
						required payments	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,000.00