DMA Inc. Case Report

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Recommendation

Based on our simulation results obtained by using Crystal Ball for two current marketing strategies, we recommend the company to consist with direct marketing instead of taking Catalina deals. This is supported by the relatively significantly higher 10000-trial-simulation mean of profit for direct marketing. However, if Catalina could attract a royalty rate of approximately 21.3% or higher, then Catalina's deal would a better choice.

Simulation Design

To measure the financial performances of two different marketing methods, before-tax net present value (NPV) of profit is used as our comparison criteria.

- **Simulation Run Preferences**

As indicated in Figure 1, the Monte Carlo simulation is designed to run 10000 trails to better understand the financial risk and uncertainty. The confidence level is set at commonly reasonable 95%.

Run preferences:	
Number of trials run	10,000
Monte Carlo	
Seed	666
Precision control on	
Confidence level	95.00%

Figure 1

- **Variable Calculations and Explanations**

More detailed calculations and explanations for each variables to achieve our target NPV profits are shown in Table 2 below.

Target Variable	Formula	Assumptions & Explanations
NPV (DMA)	$-\sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - \text{Outlay}$	The outlay is $200,000, which is the promotion budget to launch the PC MacTerm. Suppose we'll do all the sales on credit, so the cash flows would occur at the end of each month. Without more information of the company's capital costs or a common discount rate used for the industry, we estimated the monthly discount rate to be in the range of 0.2%-0.6%, which considered both risk-free interest rate and expected inflation.
Cash Flow (DMA)	= (Price to wholesalers − Variable costs) × Monthly sales	We assumed that the variable cost and the price to wholesalers would remain on the same level in the next few years.

NPV (Catalina)	$= \text{Signing Bonus} + \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}$	For the situation of teaming up with Catalina, we estimated the monthly discount rate to be in the range of 0.2%-0.6%, which considered both risk-free interest rate and expected inflation. We assumed that each payment from Catalina is received at the end of each month.
Cash Flow (Catalina)	$= max(\text{royalty payment}, \text{declared min payemnt})$	Since Catalina declared a minimum payment in the first 2 years, we calculated the final payment of Catalina by using the MAX function in excel.
Monthly Sale of month t	$= \frac{\text{avg market size}_{month\ t} \times \text{market share}}{12}$	The average market size of month t was calculated by doing the arithmetic mean of the 'market size at the beginning of month t-1' and the 'market size at the end of month t'.
Market Size at the end of month t	$= \text{market size}_{t-1} \times \left(1 + \frac{\text{yearly market growth rate}}{12}\right)$	Since we were given the range of yearly market growth rate, we calculated the market size at the end of month t by changing the yearly growth rate into the monthly growth rate.
Market Share of month t	$= MS_{t-1} \times (1 + \text{monthly MS growth rate})$	MS is the abbreviation of Market Share
Monthly Market Share Growth Rate	$= \frac{\text{Yearly MS growth multiplier} - 1}{12}$	We were given the information of market share growth multiplier, and the formula was to transfer a yearly MS growth multiplier into a monthly MS growth rate.

Table 2

- **Assumptions and Distributions**

We assumed all the given variables in DMA and Catalina deals have triangular distribution (Table 3), with the given best guesses as the likelist values, and the lowest and highest guesses as the minimum and maximum values in the distribution. The only exception was the monthly discount rate. We estimated it within the range of 0.2%~0.6% in a uniform distribution so that the probabilities are all equal (Figure 4).

Cell	Distribution
Initial Market Size	Triangular Distribution
Months to Obsolescence	Triangular Distribution
Initial Market Share	Triangular Distribution
Market Growth Rate	Triangular Distribution
Market Share Growth Multiplier	Triangular Distribution
Variable Costs	Triangular Distribution
Estimated Discount Rate	Uniform Distribution

Table 3

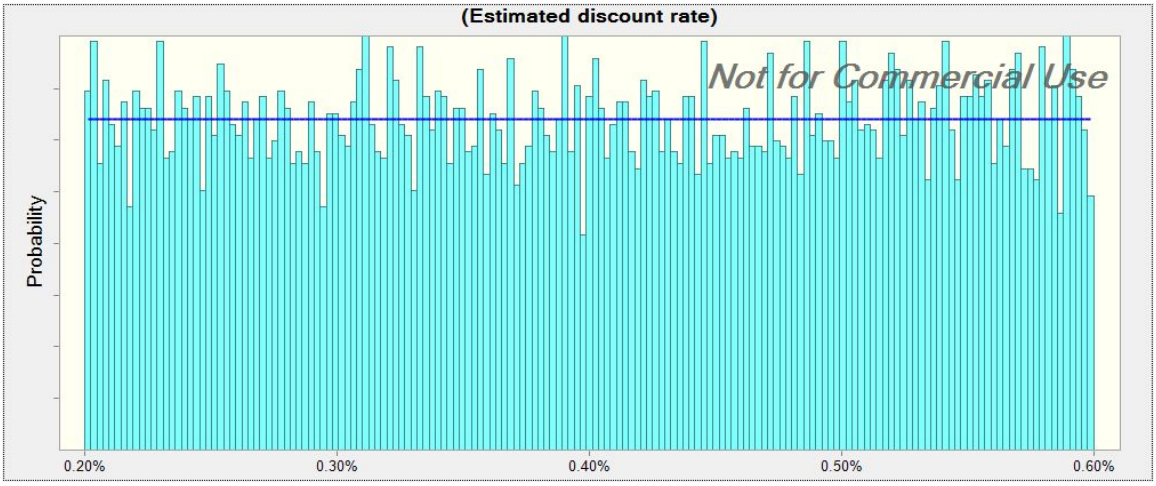

Figure 4

- **Sensitivity Tests**

According to the sensitivity analysis, the variation of years to obsolescence has significant impact on the variance of NPV for both DMA and Catalina deal situations. Therefore, we decided to calculate profits on a monthly basis to improve the accuracy.

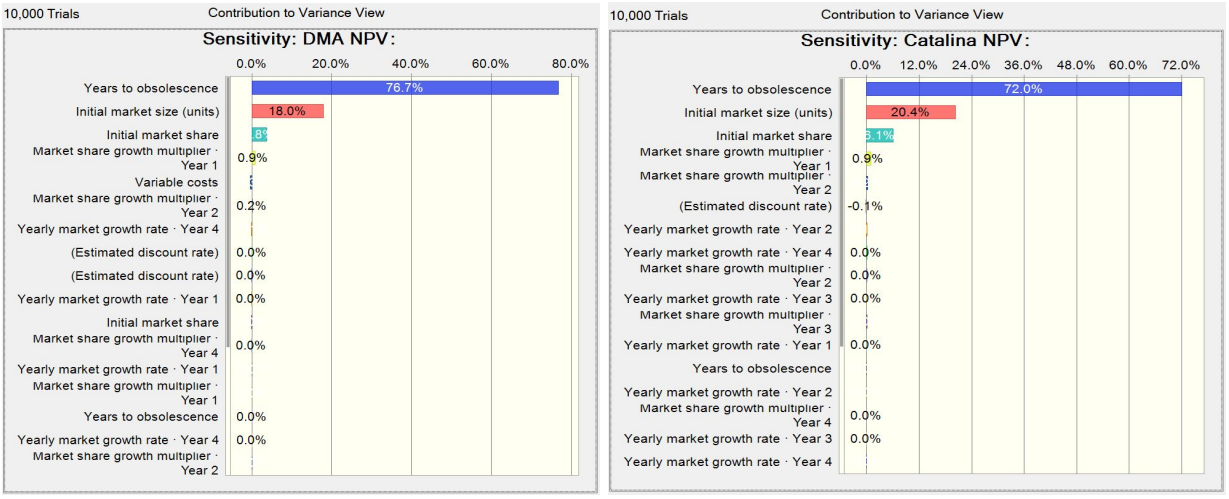

Figure 5 & 6

Outputs

- **Statistics for NPVs**

After running 10000 trails on crystal ball simulation, we got the statistical summary of two cases. As we can see from the table, the base case of DMA case is 1,111 thousand which is higher than the base case of Catalina. We can conclude that without doing simulation, the company can get best guesses on its own strategy. The mean of NPV, the best point for decision making, is significantly higher in DMA NPV than Catalina NPV. As a result, we recommend the company to employ its own marketing channel instead of taking Catalina deal. The standard deviation is the estimate for the variability or dispersion and shows the level of risk. In comparison, the standard deviation of DMA case is higher than the case of Catalina, which indicates that it is riskier to adopt its own strategy than others for DMA company. Anyway, it is worth employing its own tactic.

Statistic	Catalina NPV:	DMA NPV:
Trials	10,000	10,000
Base Case	$853,038	$1,111,629
Mean	$1,599,388	$2,225,299
Median	$1,229,708	$1,651,186
Mode	---	-$200,000
Standard Deviation	$1,235,521	$2,074,762
Variance	$1,526,511,018,942	$4,304,637,582,981
Skewness	2.13	2.07
Kurtosis	9.92	9.89
Coeff. of Variation	0.7725	0.9324
Minimum	$336,190	-$200,000
Maximum	$12,301,521	$23,033,318
Mean Std. Error	$12,355	$20,748

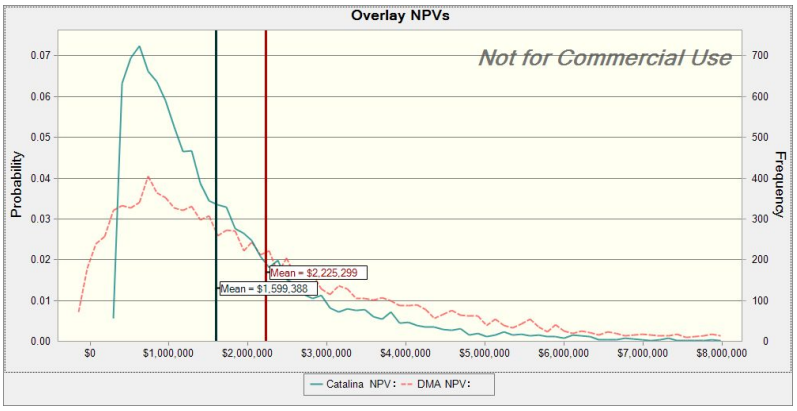

Figure 7, 8

- **Proper Royalty Rate**

As for the proper royalty rate that could make Catalina's deal more attractive, we tried out several different royalty rates with the same simulation and criteria as above procedures. The output shows that if the royalty rate is approximately 21.3%, the simulation mean of NPV for Catalina will be slightly higher than that of DMA direct marketing (Table 9). Besides, the slightly lower standard deviation indicates that Catalina deal is less risky. Thus, if Catalina can achieve a royalty rate of 21.3% or higher (instead of original 15%), the company should take this deal.

Statistic	Catalina NPV:	DMA NPV:
Trials	10,000	10,000
Base Case	$1,190,314	$1,111,629
Mean	$2,229,353	$2,225,299
Median	$1,715,384	$1,651,186
Mode	---	-$200,000
Standard Deviation	$1,769,737	$2,074,762
Variance	$3,131,970,506,309	$4,304,637,582,981
Skewness	2.09	2.07
Kurtosis	9.70	9.89
Coeff. of Variation	0.7938	0.9324
Minimum	$336,190	-$200,000
Maximum	$17,447,160	$23,033,318
Mean Std. Error	$17,697	$20,748

Table 9