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Overcoming Asset Share Pricing Criteria

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Section 5: Overcoming Asset Share Pricing Criteria / Throwing Away Threshold C-to-P

C-to-P (cost-to-premium) thresholds based on asset share pricing criteria are an inadequate proxy for marginal revenue and production costs in the MC/MR paradigm because they have three shortcomings:

1. **SC1** – When C-to-P thresholds are applied to combinations of solicitation management (SM), decisions management may draw different conclusions than when each part is evaluated separately.
2. **SC2** – Management sets the C-to-P threshold for each venture based on the uncertainty of marginal revenue and production costs in that specific venture rather than using the same benchmark (that incorporates risk directly) for all ventures.
3. **SC3** – Asset share pricing criteria customarily used to derive C-to-P thresholds do not directly incorporate duration.¹

These shortcomings are symptoms of the fact that asset share pricing criteria, which are translated into C-to-P thresholds, are an indirect way of evaluating a direct question: how does management maximize risk-adjusted profits? Unless management starts to directly evaluate the impact that solicitations have on their goal, rather than indirectly with asset share pricing criteria, they will always be prohibited from reaching their goal.

The impact of each C-to-P shortcoming is discussed in this section. In each instance it is shown that using VNB (Embedded Value of New Business) resolves the problem. Then the case study network of solicitations is re-analyzed using VNB in place of C-to-P. Using VNB, risk-adjusted profits are maximized. Therefore, the problems caused by C-to-P thresholds are cured.

SC1 – A Combination of SM Decisions Based on C-to-P May Be Different Than When Each Part Is Evaluated Separately

In order to make consistent SM decisions, the calculation of each asset share pricing criteria that create C-to-P thresholds must be able to be combined easily, preferably just by adding them. As described in Section 1, the microeconomic definition of marginal revenue from a sale is the change in aggregate revenue caused by the sale. Likewise, the definition of marginal production cost is the change in aggregate production cost. In order for any revenue/production cost proxy to be valid, the value of the proxy when used to evaluate the worth of a sale must be the same as the change in value of the proxy applied to the company in aggregate before and after the sale. Asset share pricing criteria do not meet this need; they simply do not add together.

Since the asset share pricing criteria are not additive, it is cumbersome to quantify the improvement in the aggregate picture caused by each sale. For this reason it is also more difficult for the actuary to communicate the relative worth of each sale to others. Tables 4A and 4B illustrate these problems. The prospect of selling the case study whole life product to a group age 50 and a group age 65 are first evaluated separately and then on a combined basis. Acquisition expense for each sale is equal to the pricing allowance (120 percent of premium). The profit margin and ROI for the combination of the two ventures is neither the arithmetic average nor the sum of the statistics for each venture evaluated separately. The average profit margin and

Editor's note: The following concludes Mr. Winawer's three-part article presented in previous issues of NewsDirect.

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1) Duration here refers to Macaulay's time weighted present value statistic (i.e. how long the policy persists). [Frederick Macaulay, Some Theoretical Problems Suggested by the Movement of Interest Rates, Bond Yields, and Stock Prices in the U.S. Since 1856 (New York: National Bureau of Economic Research, 1938)] It is not intended to refer to the interest sensitivity of the value of the business.

ROI shown in Table 4A are close but not equal to the actual combined result (e.g. 8.44 percent average profit margin vs. 8.36 percent actual). As actuaries would expect, the sum of the profit margins and ROIs shown in Table 4B are quite different from the actual values (e.g. 16.88 percent average profit margin vs. 8.36 percent actual). The calculations of both the combined profit margin and ROI are more complex. On the other hand, VNB for any group of ventures is always simply the sum of the VNB statistics for each venture evaluated separately. This is shown in Table 4B below.

Tables 4A and 4B illustrate that combinations of SM decisions can be distorted when only one asset share profit criteria is used. Combinations of SM decisions are also distorted because the most restrictive of multiple asset share pricing criterion is often used. When evaluated separately, each SM decision may fail certain criteria and at the same time pass others with excess. When the SM decisions are combined, the excesses of each SM decision may compensate the shortfall of others. Combined, they may pass all of the criteria.

Table 5 on page 17 shows the evaluation of two ventures that are the same as those

analyzed in Tables 4A and 4B, except that acquisition expenses are slightly greater than pricing allowances (122.4 percent of premium). Both fail one of the asset share pricing criteria. Even though profits and risks are independent, when the ventures are considered together they pass both criteria. Table 5 also illustrates that VNB produces congruous conclusions because only one statistic is used and it is additive.

SC2 - C-to-P Thresholds Do Not Incorporate Uncertainty of Sales Success and Profits Directly

The risk of ventures not realizing anticipated profits because of uncertain response rates and/or profits after sale varies from venture to venture. Management should require ventures with higher levels of uncertainty to achieve higher levels of profitability to compensate for the extra risk taken. At the same time, in order for the MC/MR paradigm to be practicable, management must be able to accurately measure the impact to aggregate profitability from each venture they undertake. C-to-P thresholds based on asset share pricing criteria do not meet the combination of these needs, but VNB does.

TABLE 4A: Margin & ROI Are Cumbersome To Combine; Neither Combine Using Arithmetic Averages.

	<i>Age 50</i>	<i>Age 65</i>	<i>Average</i>	<i>Actual</i>
Premium	\$2,000	\$2,000	\$2,000	\$2,000
Margin	8.84%	8.04%	8.44%	8.36%
ROI	14.99%	18.13%	16.56%	16.64%

TABLE 4B: Margin & ROI Are Cumbersome To Combine; Neither Combine Using Addition, Except For VNB.

	<i>Age 50</i>	<i>Age 65</i>	<i>Sum</i>	<i>Actual</i>
Premium	\$2,000	\$2,000	\$2,000	\$2,000
Margin	8.84%	8.04%	8.44%	8.36%
ROI	14.99%	18.13%	33.12%	16.64%
VNB @ 10%	\$260	\$450	\$710	\$710

**TABLE 5: Combining Margin & ROI Can Produce
Incongruous Conclusions; VNB Does Not.**

	<i>Age 50</i>	<i>Age 65</i>	<i>Combined</i>
Premium	\$2,000	\$2,000	\$4,000
Margin	8.39%	7.74%	8.00%
Criteria	8.00%	8.00%	8.00%
ROI	14.23%	17.32%	15.84%
Criteria	15.00%	15.00%	15.00%
Decision	Do Not Send	Do Not Send	Send
VNB @ 10%	\$230	\$419	\$649
Criteria	\$0	\$0	\$0
Decision	Send	Send	Send

In order to reflect risk in C-to-P thresholds, the asset share pricing criteria for each venture must change based on the risk present. For example, while the case study criteria for whole life insurance is set at 8 percent profit margin and 15 percent ROI, the criteria for long-term-care insurance that has greater claim uncertainty may be 10 percent profit margin and 20 percent ROI. However, assigning different criteria for each venture makes it difficult to quantify the change in aggregate profitability as the appropriate criteria to apply in aggregate changes the with product and sales method mix. Continuing the example, if the company chooses to sell only whole life insurance, then the appropriate aggregate benchmarks are eight percent profit margin and 15 percent ROI. On the other hand, if the company sells 50 percent whole life and 50 percent long term care insurance, then aggregate profitability should be measured against criteria that would be roughly nine percent profit margin (50 percent * 8 percent + 50 percent * 10 percent) and 17.5 percent ROI (50 percent * 15 percent + 50 percent * 20 percent). As we saw in Table 4A, the precise benchmark is more difficult to derive. It is easy to see how calculating the marginal value of SM decisions (defined as the change in aggregate profitability) is difficult to say the least.

For VNB, different risk discount rates can be used for each venture as the level of

uncertainty of profits and probability of sale varies. The sum of these VNB statistics, even though they are based on different risk discount rates, is still an appropriate benchmark for aggregate profitability. The change in aggregate VNB caused by any SM decision is equal to the VNB for that decision. Ventures that produce positive VNB increase aggregate VNB and ventures with VNB less than zero decrease aggregate VNB. Thus, marginal values are readily available.

SC3 - Asset Share Pricing Criteria Do Not Directly Incorporate Duration

Forward-looking management is concerned with more than just the short-term profit picture of a venture; they are also concerned with how long the profits will continue. Unfortunately, C-to-P thresholds based on asset share pricing criteria create SM decisions that do not take the duration of profits directly into account. On the other hand, VNB reflects duration explicitly.

The two most common asset share pricing criteria are profit margin and ROI. Neither of these criteria directly incorporate duration. For example, the sale of a five-year term insurance policy could theoretically have the same profit margin and ROI as a whole life policy issued to the same person. Under the

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C-to-P approach the two sales are deemed equally advantageous. Management would be ambivalent about which product to offer even though they anticipate receiving several times as much absolute profit from the whole life policy over the entire policy's term.

VNB takes duration directly into account because it is an absolute dollar value that relates to profits rather than a rate of return (as is ROI) or a measure of profits that is in terms of revenue (as is profit margin). With VNB, management explicitly assigns the relative worth of future uncertain profits through the risk discount rate. Increasing risk discount rates has two effects; the total value assigned to a venture decreases and the relative worth of more distant profits is reduced.

Table 6A provides an example in which asset share pricing criteria does not reflect duration well, whereas VNB does. A whole life policy and a five-year term policy issued to the same person have the same anticipated premium and acquisition cost. The ROI for the five-year term policy (28.69 percent) is actually higher than for the whole life policy (18.13 percent) and the profit margins are essentially the same (8.00 percent term vs. 8.04 percent whole life).

Therefore management teams that use profit margin and ROI would prefer the term policy over the whole life policy. However, total profits for the whole life policy are more than three times as high as for the term policy. In order for management to enjoy the term policy's higher ROI over the same duration as the whole life policy, more sales must be made in the future. This adds both effort and risk to the prospect of offering term insurance.² On the other hand, management teams that use VNB at the 10 percent risk discount rate would prefer the whole life policy (\$450 whole life VNB vs. \$368 term VNB).

Table 6B on page 19 graphically illustrates how VNB explicitly takes duration into account as management consciously sets the risk discount rate. The VNB for both the whole life and term policies decrease monotonically as management increases the risk discount rate. For example, the whole life VNB starts at \$2,250 at zero percent risk discount rate. As the risk discount rate increases to 10 percent, VNB decreases to \$450. VNB continues to decrease to zero at the 18.13 percent risk discount rate level and becomes increasingly negative thereafter. If management feels that the appropriate risk discount

TABLE 6A: Margin & ROI Do Not Reflect Duration; VNB Does.

	<i>Whole Life</i>	<i>Five Year Term</i>
Premium	\$2,000	\$2,000
Marketing Cost	\$2,400	\$2,400
Margin	8.04%	8.00%
ROI	18.13%	28.69%
Total Profit	\$2,215	\$702
VNB @ 10%	\$450	\$368

2) Of course the decision to sell term or whole life should consider available capital. If the company does not have enough capital for the whole life policy at this time, they may be forced to offer term insurance until an adequate capital base is formed.

TABLE 6B: Margin & ROI Do Not Reflect Duration; VNB Does

	<i>Whole Life</i>	<i>Five Year Term</i>
	<i>Issue Age 65</i>	<i>Issue Age 65</i>
Premium	\$2,000	\$2,000
Marketing Cost	\$2,400	\$2,400
Margin	8.04%	8.00%
ROI	18.13%	28.69%
Total Profit	\$2,215	\$702
VNB @ 10%	\$450	\$368
VNB @ 15%	\$131	\$245
VNB @ 18.13%	\$0	\$178
VNB @ 28.69%	(\$271)	0

TABLE 7: Summary Of Results Under Various SM Methods

SM Method	Risk-Adjusted Profits	
Example 1 —	Unrefined Analysis — DC2 or DC3	\$1,939,523
Example 2 —	Refined Analysis — Marginal Costs — C-to-P Thresholds	\$2,414,131
Example 3 —	Refined Analysis — Marginal Costs — VNB in Lieu of C-to-P Thresholds	\$2,575,810

rate is greater than 18.13 percent, then selling the whole life policy would decrease the company's aggregate risk-adjusted profits because its VNB is less than zero. With the risk discount rates this high, management would not sell the product.

Also, as management increases the risk discount rate, the risk penalty for more distant profits increases, making the term policy more preferable. Up to the 10 percent risk discount rate level, whole life is preferred (\$450 whole life vs. \$368 term). Management's preference changes between 10 percent and 15 percent. And, at the 15 percent risk discount rate level and beyond the term policy is preferred (\$131 whole life vs. \$235 term at 15 percent). On the other hand, management may feel that term insurance is more risky and assign different risk discount rates to each product. For example,

they may compare the whole life VNB at 10 percent (\$450) to the term VNB at 15 percent (\$245).

VNB is always equal to zero when the risk discount rate is equal to the ROI. The ROI for the whole life policy in Table 6B is 18.13 percent. The whole life VNB at this risk discount rate is zero. The term policy's ROI is 28.69 percent and its VNB is zero at 28.69 percent as well. At these points, the company is indifferent about relative duration. For example, if management deemed that the appropriate risk discount rate for the whole life policy in Table 6B is 18.13 percent, then management would view any venture of similar risk that has an 18.13 percent ROI to be worth the same. This would be true regardless of the policy's duration.

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Maximizing Risk-Adjusted Profits Using VNB in Lieu of C-to-P

The shortcomings of C-to-P thresholds have been discussed and it has been shown that VNB overcomes each shortcoming. It still remains to be demonstrated that using VNB in lieu of C-to-P thresholds maximizes risk-adjusted profits. Exhibit 3 provides the demonstration using the case study solicitation network. In this exhibit, VNB is used in place of C-to-P to make SM decisions and risk-adjusted profits are maximized. Therefore, it is clear that VNB, rather than C-to-P, should be used to make SM decisions. Risk-adjusted profits from Example 3 on page 25 are compared to the maximum value of risk-adjusted profits from Examples 1 and 2 in Table 7 on page 19. In the next section the results from each exhibit are discussed in more detail.

Section 6: Summary and Conclusion

In this essay it has been shown that management can maximize risk-adjusted profits by:

- Including only marginal costs in SM decisions (as shown in Example 1),
- Refining the analysis (as shown in Example 2), and
- Using VNB, rather than C-to-P thresholds (as shown in Example 3).

In Example 3 the case study solicitation network was re-evaluated using decision criteria 4 as this was shown to be the best approach in Example 1. The analysis was refined based on both probability of sale (time since the name had been required and age) and profitability (male vs. female) which was shown to improve results in Example 2. Finally, the criteria that VNB based on a 10 percent risk discount rate must be greater than zero was used to make SM decisions in lieu of threshold C-to-P ratios as was suggested in the last section. Table 8 compares the results from each of these examples. Risk-adjusted profits under Example 3 are \$2,575,810, which is greater than under any other method.

TABLE 8: Summary of results under various SM methods

SM Method	Profit Margin	ROI	Risk-Adjusted Profits
Example 1 — Unrefined Analysis — Tested Marginal vs. Fixed Costs — C-to-P Thresholds			
DC 1 — First Offer with Fixed Costs	Profits <\$0 (N/A)	Profits <\$0 (N/A)	(\$1,950,000)
DC 2 — Average of All Offers with Fixed Costs	8.99%	19.94%	\$1,939,523
DC 3 — Average of All Offers without Fixed Costs	8.99%	19.94%	\$1,939,523
DC 4 — Marginal Costs	9.45%	21.33%	\$1,672,647
Example 2 — Refined Analysis — Marginal Costs — C-to-P Thresholds	11.83%	31.89%	\$2,414,131
Example 3 — Refined Analysis — Marginal Costs — VNB in Lieu of C-to-P Thresholds	11.06%	29.89%	\$2,575,810

The case study examples in this essay were constructed to illustrate concepts and not to evaluate the worthiness of the techniques advocated. As such, caution should be taken when interpreting these results.

A hypothetical network of solicitations to a simple illustrative population of consumers was analyzed. Actual results will vary based on demographics of the consumer base and product profitability profile. Only one type of product, whole life insurance, was offered.

The relative worth of each technique was greatly dependent upon the order in which they were introduced.

With these precautions in mind, management can draw some interesting conclusions by comparing the results in Table 8 on page 20.

Using fixed costs in the decision process and stopping at the first campaign produced very poor results. Risk-adjusted profits were (\$1,950,000). Without better information, it is unlikely that the company would ever have decided to spend the money to generate a list of consumers. In fact they would likely leave the market altogether. This shows how important marginal expense analysis can be.

In Example 1, using marginal costs in SM decisions actually decreased risk-adjusted profits from decision criteria 2 and 3. Risk-adjusted profits under decision criteria 2 and 3 are both \$1,939,523 and only \$1,672,647 under decision criteria 4. This would not have happened if VNB was introduced at the same time. While not illustrated, risk-adjusted profits using an unrefined profitability model, marginal acquisition expenses and VNB produces the same risk-adjusted profits as decision criteria 2 and 3. This highlights the importance of having an appropriate measure of marginal revenue and production cost when applying the MC/MR paradigm. Without VNB to serve as the measure of marginal revenue and production costs, only acquisition expenses were handled appropriately. Thus the MC/MR paradigm failed to maximize risk-adjusted profits.

Refining profitability estimates was shown to be worthwhile. Risk-adjusted profits were increased to \$2,414,131, which is 24 percent greater than the best outcome in Example 1. This should be true for any company that has products with profitability that varies significantly among insured lives and where response rates to offers vary

greatly among consumers. Any insurer that has the opportunity to distinguish solicitation decisions by profitability and probability of sale should do so.

Using VNB in lieu of C-to-P after profit estimates had been refined did not improve results significantly, as the advantages of VNB are more subtle. Risk-adjusted profits increased from \$2,414,131 in Example 2 to \$2,575,810. With more refined profitability estimates, and with decisions that involve only one product, this result may occur rather often. On the other hand, using VNB when more than one product is involved will often make significant improvements. VNB provided several intangible advantages as well. Analysis was made more practical to conduct. The resulting information relating to the specific network of solicitations was easier to interpret and communicate to others. Also, objective comparison to other ventures of different risk was made possible.

This essay has shown how using the MC/MR paradigm with VNB as a proxy for the combination of production costs and marginal revenue produces superior SM decisions. These principles can also be applied to improving other business decisions that face direct response management. The interested reader may refer to Appendix 3 of this essay.

APPENDIX 3: FURTHER WORK / EXTENDED APPLICATION

This essay advocated using the MC/MR microeconomic paradigm with VNB as a proxy for marginal revenue and production costs to make SM decisions. The same paradigm can and should be applied to each step in the direct response insurance marketing and sales process.

In "Macro Pricing: A Comprehensive Product Development Process," Chalke introduces an algorithm based on the MC/MR paradigm to set premium rates.³ Using VNB as the utility measure for alternative ventures can enhance this algorithm.

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3) Chalke, Shane A., *TSA XLIII*, 1991.

The MC/MR paradigm with VNB can be used to evaluate consumer list generation proposals. Management needs only to develop a model of their company's network of solicitations such as that used in this essay and compare the total VNB that results under each proposal. An important subsidiary exercise is assigning a value to each name on the list of potential customers. This value is simply equal to the VNB of all anticipated future sales to that person times the probability of each sale.

The application of the MC/MR paradigm with VNB to SM involving lists of prospective consumers who have not yet purchased insurance was discussed in this essay. The same principles apply when evaluating policyholder

marketing campaigns. In fact, it is best to include VNB from anticipated future policyholder-marketing efforts with the VNB from the initial sale when evaluating initial policy acquisition expenses. Otherwise the value of the initial sale will be understated and management will be directed to spend less to acquire policies than is appropriate. Both sales and profits will fall short of their potential maximum.

It is clear that the techniques discussed in this essay: marginal acquisition expense SM decisions, refined analysis, and using value of new business in the MC/MR paradigm, are well worth consideration for a variety of financial decisions. 📖

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EXAMPLE 1: COMPARISON OF FOUR BASIC DECISION CRITERIA

	First Offer with Fixed Costs	Average of All Offers with Fixed Costs	Average of All Offers without Fixed Costs	v
List Generation	Formulas	Formulas	Formulas	Formulas
1. Fixed Costs	Values	Values	Values	Values
2. Names Generated	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000
	4,000,000	4,000,000	4,000,000	4,000,000
Offer 1 Anticipated Costs & Sales				
3. Marginal Costs	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
4. # Mailed	4,000,000	4,000,000	4,000,000	4,000,000
5. Response Rate	0.325%	0.325%	0.325%	0.325%
6. # Issued	13,000	13,000	13,000	13,000
7. Avg. Premium	\$284.46	\$284.46	\$284.46	\$284.46
8. Premium Issued	\$3,698,000	\$3,698,000	\$3,698,000	\$3,698,000
Decision Criteria				
9. Costs Included	Offer 1	Offer 1	Offer 1	Offer 1
10. Premium Included	Fixed & Marginal Costs	Fixed & Marginal Costs	Marginal Costs	Marginal Costs
11. C-to-P	1+3.	\$5,000,000	\$2,000,000	\$2,000,000
12. Threshold C-to-P	8.	\$3,698,000	\$3,698,000	\$3,698,000
Decision	9/10.	135.21%	120.00%	54.08%
	11. < 12. ?	Offer 1 Not Acceptable, Do Not Consider Offer 2	Offer 1 Acceptable, Consider Offers 1&2	120.00%
Offer 2 Anticipated Costs & Sales				
13. Marginal Costs	\$1,993,500	\$1,993,500	\$1,993,500	\$1,993,500
14. # Mailed	3,987,000	3,987,000	3,987,000	3,987,000
15. Response Rate	0.225%	0.225%	0.225%	0.225%
16. # Issued	8,969	8,969	8,969	8,969
17. Avg. Premium	\$293.11	\$293.11	\$293.11	\$293.11
18. Premium Issued	\$2,628,756	\$2,628,756	\$2,628,756	\$2,628,756
Decision Criteria				
19. Costs Included	Offers 1&2	Offers 1&2	Offers 1&2	Offers 1&2
20. Premium Included	Fixed & Marginal Costs	Fixed & Marginal Costs	Marginal Costs	Marginal Costs
21. C-to-P	1+3+13.	\$6,993,500	\$3,993,500	\$1,993,500
22. Threshold C-to-P	8+18.	\$6,326,756	\$6,326,756	\$2,628,756
Decision	19/20.	110.54%	120.00%	75.83%
	21. < 22. ?	Offer 1 Not Acceptable, Consider Offers 1&2	Offer 1 Not Acceptable, Consider Offers 1&2	120.00%
Offer 3 Anticipated Costs & Sales				
23. Marginal Costs	\$1,989,016	\$1,989,016	\$1,989,016	\$1,989,016
24. # Mailed	3,978,032	3,978,032	3,978,032	3,978,032
25. Response Rate	0.125%	0.125%	0.125%	0.125%
26. # Issued	4,968	4,968	4,968	4,968
27. Avg. Premium	\$315.72	\$315.72	\$315.72	\$315.72
28. Premium	\$1,568,504	\$1,568,504	\$1,568,504	\$1,568,504
Decision Criteria				
29. Costs Included	Offers 1,2&3	Offers 1,2&3	Offers 1,2&3	Offers 1,2&3
30. Premium Included	Fixed & Marginal Costs	Fixed & Marginal Costs	Marginal Costs	Marginal Costs
31. C-to-P	1+3+13+23.	\$8,982,516	\$5,982,516	\$1,989,016
32. Threshold C-to-P	8+18+28.	\$7,895,260	\$7,895,260	\$1,568,504
Decision	29/30.	113.77%	120.00%	126.81%
	31. < 32. ?	Offer 1 Not Acceptable, Consider Offers 1,2&3	Offer 1 Not Acceptable, Consider Offers 1,2&3	120.00%
Final Decision Profit Statistics				
Conclusion	1.	Send Offers 1,2&3	Send Offers 1,2&3	Send Offers 1&2
Cost	\$3,000,000	\$6,982,516	\$6,982,516	\$6,993,500
Premium	\$0	\$7,895,260	\$7,895,260	\$6,326,756
Marginal	N/A	8.99%	8.99%	9.45%
ROI	N/A	19.94%	19.94%	21.33%
Risk Adjusted Profits	(\$1,950,000)	\$1,939,523	\$1,939,523	\$1,672,647

EXAMPLE 2: COMPARISON OF AGE/SEX DISTINCT C-TO-P TO AGGREGATE C-TO-P DECISIONS

		Refined C-to-P Decisions Based on Age & Sex				Unrefined	
Formulas for A,B,C&D	A: Males Age 50 Values	B: Female Age 50 Values	C: Males Age 65 Values	D: Female Age 65 Values	Formulas	Combined Values	Formulas
1. Fixed Costs 2. Names Generated	\$750,000 1,000,000	\$750,000 1,000,000	\$750,000 1,000,000	\$750,000 1,000,000	A+ B+ C+ D A+ B+ C+ D	\$3,000,000 4,000,000	\$3,000,000 4,000,000
Offer 1 Anticipated Costs & Sales							
3. Marginal Costs	500,000	500,000	500,000	500,000	B+ C+ D B+ C+ D	1,500,000 3,000,000	2,000,000 4,000,000
4. # Mailed	1,000,000	1,000,000	1,000,000	1,000,000	6 / 4	0.350%	0.32%
5. Response Rate	0.250%	0.250%	0.400%	0.400%	B+ C+ D 8 / 6	13,000 \$349.75	13,000 \$284.46
6. # Issued	2,500	2,500	4,000	4,000	B+ C+ D 3	3,248,000	3,698,000
7. Avg Premium	\$180.00	\$180.00	\$349.75	\$349.75	8	\$1,500,000	\$2,000,000
8. Premium Issued	450,000	450,000	1,399,000	1,399,000	9 / 10	\$3,248,000	\$3,698,000
Decision Criteria							
9. Costs Included	Offer 1	Offer 1	Offer 1	Offer 1	3	N/A	3
10. Premium Included	\$500,000	\$500,000	\$500,000	\$500,000	8	\$1,500,000	8
11. C-to-P	\$450,000	\$450,000	\$1,399,000	\$1,399,000	9 / 10	\$3,248,000	9 / 10
12. Threshold C-to-P Decision	111.11% 98.00% Offer 1 Not Acceptable, Do Not Consider Offer 2	137.00% 157.00% Offer 1 Acceptable, Consider Offer 2	60.00% 173.00% Offer 1 Acceptable, Consider Offer 2	55.74% 173.00% Offer 1 Acceptable, Consider Offer 2		Varies by Age & Sex	17 / 100% 120.00%
Offer 2 Anticipated Costs & Sales							
13. Marginal Costs	498,750	498,750	498,000	498,000	C+ D C+ D	996,000 1,992,000	1,993,500 3,987,000
14. # Mailed	997,500	997,500	996,000	996,000	16 / 14	0.300%	0.22%
15. Response Rate	0.150%	0.150%	0.300%	0.300%	C+ D 18 / 16	5,976 \$349.75	8,969 \$293.11
16. # Issued	1,496	1,496	2,988	2,988	C+ D 168 / 17	2,090,106	2,628,756
17. Avg Premium	\$180.00	\$180.00	\$349.75	\$349.75			
18. Premium Issued	269,325	269,325	1,045,053	1,045,053			
Decision Criteria							
19. Costs Included	Offer 2	Offer 2	Offer 2	Offer 2	13	N/A	13
20. Premium Included	\$498,750	\$498,750	\$498,000	\$498,000	18	\$2,090,106	18
21. C-to-P	\$269,325	\$269,325	\$1,045,053	\$1,045,053	19 / 20	47.65%	75.83%
22. Threshold C-to-P Decision	185.19% 137.00%	137.00%	60.00%	173.00%			120.00%
Offer 3 Anticipated Costs & Sales							
23. Marginal Costs	496,506	496,506	496,506	496,506	D D	496,506 993,012	1,989,016 3,978,032
24. # Mailed	993,012	993,012	993,012	993,012	26 / 24	0.200%	0.12%
25. Response Rate	0.200%	0.200%	0.200%	0.200%	D 28 / 26	1,986 \$349.75	4,968 \$315.72
26. # Issued	1,986	1,986	3,349.75	3,349.75			
27. Avg Premium	\$180.00	\$180.00	\$349.75	\$349.75			
28. Premium	354,270	354,270	694,612	694,612			
Decision Criteria							
29. Costs Included	Offer 3	Offer 3	Offer 3	Offer 3	23	\$496,506	23
30. Premium Included	\$496,506	\$496,506	\$694,612	\$694,612	28	\$1,568,504	28
31. C-to-P	\$354,270	\$354,270	\$1,045,053	\$1,045,053	29 / 30	71.48%	126.81%
32. Threshold C-to-P Decision	173.00%	173.00%	60.00%	173.00%			120.00%
Final Decision Profit Statistics							
Conclusion	\$750,000	\$1,250,000	\$1,748,000	\$2,244,506	A+ B+ C+ D A+ B+ C+ D	\$5,992,506 \$6,032,718	\$6,992,500 \$6,326,756
Cost	\$0	\$450,000	\$2,444,053	\$3,138,665			
Premium							
Margin							
ROI							
Risk Adjusted Profits							

EXAMPLE 3: SM DECISIONS WITH VNB AND MARGINAL COSTS

	A. Male Age 50	B. Female Age 50	C. Male Age 65	D. Female Age 65
List Generation	Formulas	Formulas	Formulas	Formulas
1. Fixed Costs	\$750,000	\$750,000	\$750,000	\$750,000
2. Names Generated	1,000,000	1,000,000	1,000,000	1,000,000
Offer 1 Anticipated Costs & Sales				
3. Marginal Costs	\$500,000	\$500,000	\$500,000	\$500,000
4. # Mailed	1,000,000	1,000,000	1,000,000	1,000,000
5. Response Rate	0.250%	0.250%	0.400%	0.400%
6. # Issued	2,500	2,500	4,000	4,000
7. Avg Premium	\$180.00	\$180.00	\$349.75	\$349.75
8. Premium Issued	\$450,000	\$450,000	\$1,399,000	\$1,399,000
Decision Criteria	Offer 1	Offer 1	Offer 1	Offer 1
9. Costs Included	\$500,000	\$500,000	\$500,000	\$500,000
10. Premium Included	\$450,000	\$450,000	\$1,399,000	\$1,399,000
11. VNB @ 10%	\$29,315	\$196,124	\$0	\$0
12. Threshold VNB	\$0	\$0	\$0	\$0
Decision	11. < 12. ?	11. < 12. ?	11. < 12. ?	11. < 12. ?
Offer 2 Anticipated Costs & Sales				
13. Marginal Costs	\$498,750	\$498,750	\$498,000	\$498,000
14. # Mailed	997,500	997,500	996,000	996,000
15. Response Rate	0.150%	0.150%	0.300%	0.300%
16. # Issued	1,496	1,496	2,988	2,988
17. Avg Premium	\$180.00	\$180.00	\$349.75	\$349.75
18. Premium Issued	\$269,325	\$269,325	\$1,045,053	\$1,045,053
Decision Criteria	Offer 2	Offer 2	Offer 2	Offer 2
19. Costs Included	\$498,750	\$498,750	\$498,000	\$498,000
20. Premium Included	\$997,500	\$269,325	\$1,045,053	\$1,045,053
21. VNB @ 10%	(\$111,241)	(\$35,346)	\$0	\$0
22. Threshold VNB	\$0	\$0	\$0	\$0
Decision	21. < 22. ?	21. < 22. ?	21. < 22. ?	21. < 22. ?
Offer 3 Anticipated Costs & Sales				
23. Marginal Costs	\$496,506	\$496,506	\$496,506	\$496,506
24. # Mailed	993,012	993,012	993,012	993,012
25. Response Rate	0.200%	0.200%	0.200%	0.200%
26. # Issued	1,986	1,986	1,986	1,986
27. Avg Premium	\$349.75	\$349.75	\$349.75	\$349.75
28. Premium	\$694,612	\$694,612	\$694,612	\$694,612
Decision Criteria	Offer 3	Offer 3	Offer 3	Offer 3
29. Costs Included	\$496,506	\$496,506	\$496,506	\$496,506
30. Premium Included	\$694,612	\$694,612	\$694,612	\$694,612
31. VNB @ 10%	\$1,481	\$1,481	\$0	\$0
32. Threshold VNB	\$0	\$0	\$0	\$0
Decision	31. < 32. ?	31. < 32. ?	31. < 32. ?	31. < 32. ?
Final Decision Profit Statistics				
Conclusion	Send Offer 1	Send Offer 1,2&3	Send Offers 1,2&3	Send Offers 1,2&3
Cost	\$1,250,000	\$1,250,000	\$2,244,506	\$2,244,506
Premium	\$450,000	\$450,000	\$3,138,665	\$3,138,665
Margin				
ROI				
Risk Adjusted Profits				