

Consider the following scenario.

BigCorp has \$30 million available for the coming year to allocate to its three subsidiaries. Because of commitments to stability and of personnel employment and for other reasons, BigCorp has established a minimal level of funding for each subsidiary. These funding levels are \$3 million, \$5 million, and \$8 million, respectively. Owing to the nature of its operation, subsidiary 2 cannot utilize more than \$17 million without major new capital expansion which BigCorp is unwilling to undertake at this time. Each subsidiary has the opportunity to conduct various projects with the funds it receives. A rate of return (as a percent of investment) has been established for each project. In addition, certain projects permit only limited investment. The data for each project is shown in the table.

Subsidiary	Project	Rate of Return (%)	Maximum Investment (\$M)
1	1	7	6
1	2	5	5
1	3	8	9
2	4	5	7
2	5	7	10
2	6	9	4
3	7	10	6
3	8	8	3

You were tasked with the job of determining how to allocate the \$30 million among the three subsidiary companies and individual projects in order to maximize the total return investment. You formulated this problem as a linear program with decision variables:  $x_k$  = (\$M to invest in project  $k$ ) and objective function which gives the return on investment in \$M. The solution you found is

$$x^* = [a \ 0 \ 9 \ 0 \ 8 - a \ 4 \ 6 \ 3]^T, 0 \leq a \leq 6, \quad z^* = 2.48$$

As part of your report to the board of directors, compose an executive summary of your findings and recommendations.

**Note:** The Executive Summary on the following page is an *example*. There are many good ways to compose such a summary. However, it should contain the following general elements: conciseness, action plan, summary of key results, interpretations relevant to policy makers, suggestions for further analysis/consideration.

## Executive Summary

This year's \$30M annual allocations for BigCorp's subsidiaries should be allocated as follows:

Subsidiary	Allocation
1	\$13M
2	\$8M
3	\$9M

Funding for individual projects should be allocated as follows:

Project	Allocation
1	\$4M
3	\$9M
5	\$4M
6	\$4M
7	\$6M
8	\$3M

With this plan, BigCorp will realize an estimated \$2.48M (8.27%) return on investment.

This allocation plan is an optimal solution for maximizing return on investment based on the following conditions.

- Minimal funding levels for each subsidiary are \$3M, \$5M and \$8M, respectively.
- \$30M is available for allocation.
- The rates of return on each of eight projects is known.
- Maximum investments in each project are given.

It should be noted that each subsidiary is allocated at least \$1M above the minimum required allocation to ensure stability of operations and cash flow. Also note that the allocation for Subsidiary 3 is not flexible with respect to any market changes because allocations are maximized in all available projects. Equally optimal allocations are possible. We have chosen the option that provide the largest flexibility in market changes for Subsidiaries 1 and 2 with respect to projects 1 and 5.