

## Appendix A: Modeling Methodology

The basic methodology employed was to develop probabilistic cash flow models for each of the decision options (except for the split procurement options, which were analyzed by interpolating from results of other options).

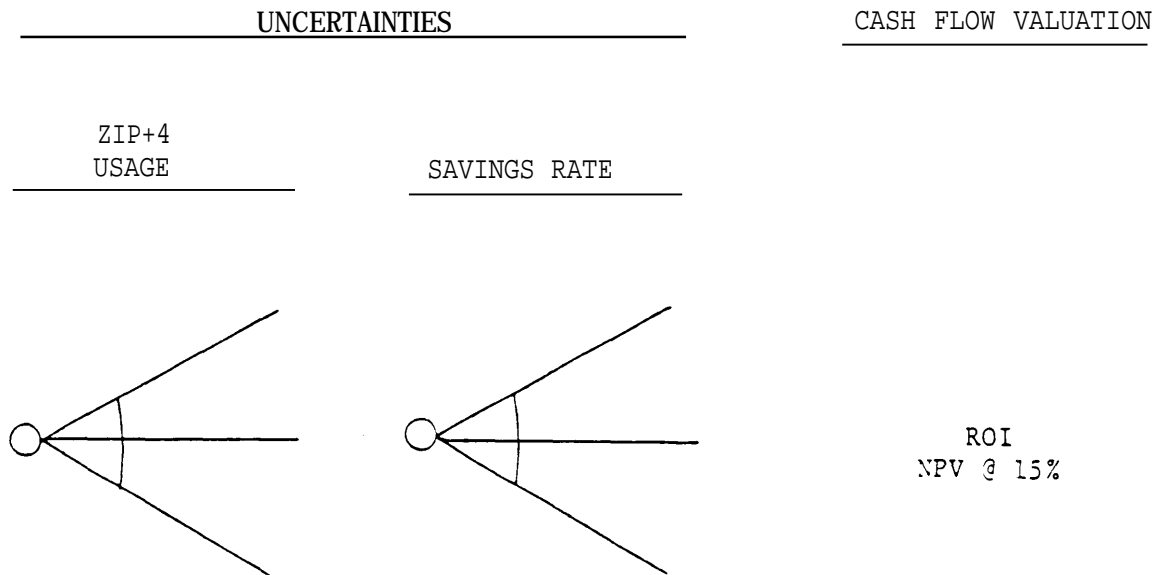
A decision tree was developed for each option. The tree included the uncertainties discussed previously, as applicable to each specific option, and a cash flow valuation measured by rate of return (ROI) and net present value (NPV) discounted at 15 percent, as illustrated conceptually in figure A-1. The uncertainties (i.e., ZIP+4 usage, savings rate, multi-line OCR performance rate) were treated as continuous random variables. The continuous random distributions were approximated by the Pearson-Tukey approximation which uses values of the variable at three discrete points: the 5, 50, and 95 percentiles. Pearson-Tukey assigns probabilities of 0.185, 0.63, and 0.185 to these three percentiles, as shown in figure A-2.

Simplified schematic models for options A, B, C, D, and E are shown in figures A-3 through A-7. The full models are shown in appendix B.

The models were run on an IBM Personal Computer using Lotus 1-2-3 and proprietary software.

Figure A-1

Probabilistic Cash Flow Model  
(Illustrated for Option A: Single-Line OCR)



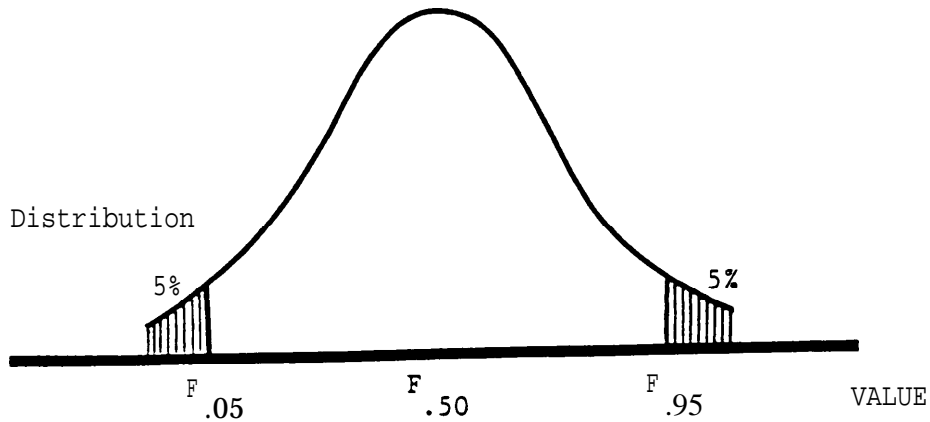
The uncertainties are continuous random variables. A simplified representation of these distributions is used in the analysis (as explained in figure A-2).

Source: Office of Technology Assessment

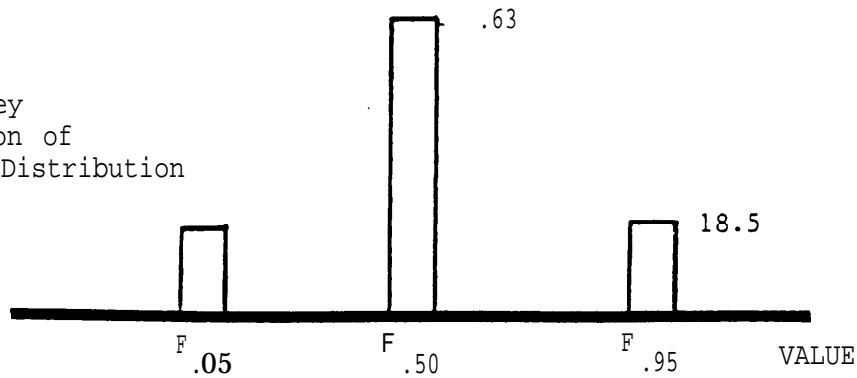
Figure A-2

# Simplified Representation of Continuous Probability Distribution

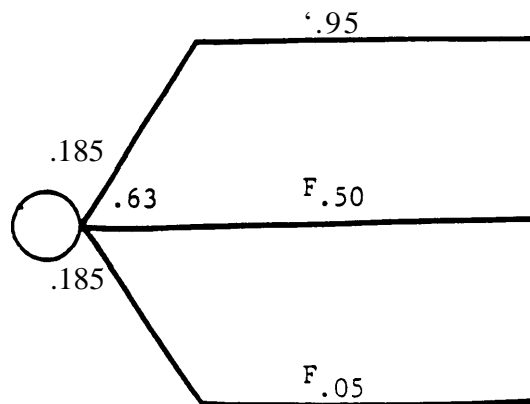
Continuous Distribution



Pearson-Tukey  
Approximation of  
Continuous Distribution

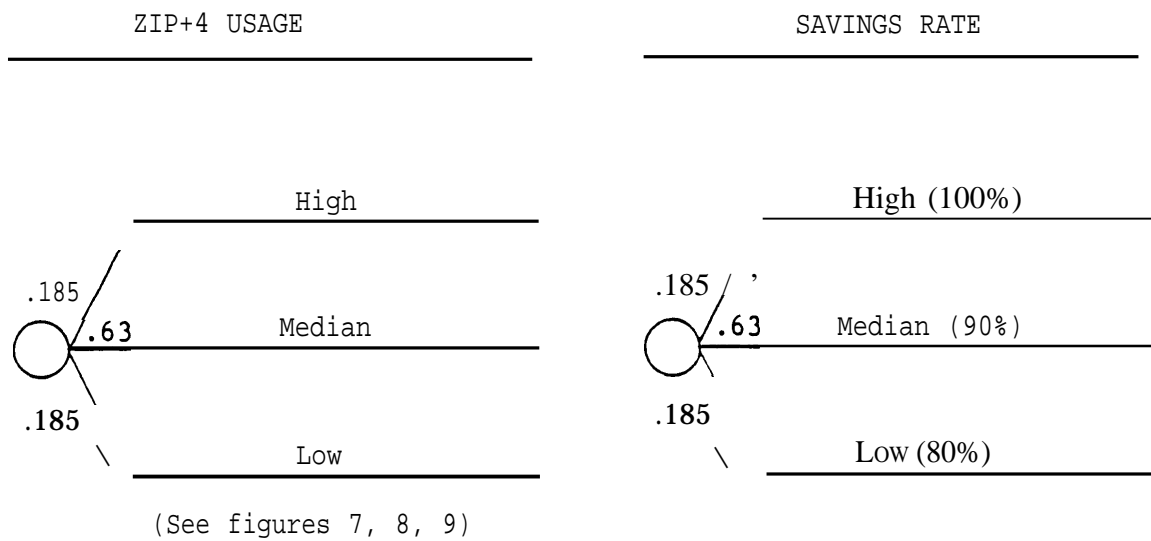


Model Represen-  
tation of  
Approximation



This representation is a Pearson-Tukey approximation. It was chosen because it provides an excellent approximation to a wide range of continuous probability distributions, as explained in Keefer and Bodily (1983).

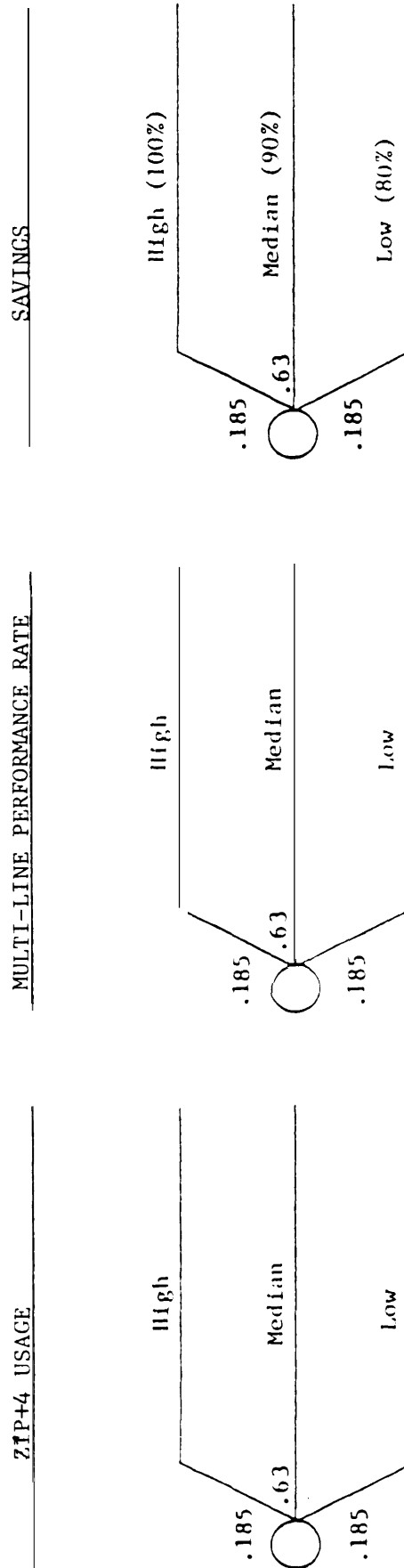
Figure A-3  
Simplified Schematic Model for  
Option A: Single-Line OCR



SOURCE: Office of Technology Assessment

Figure A-4

Simplified Schematic Model for  
Option B: Multi-Line OCR with ZIP+4



Same as with  
single-line OCR

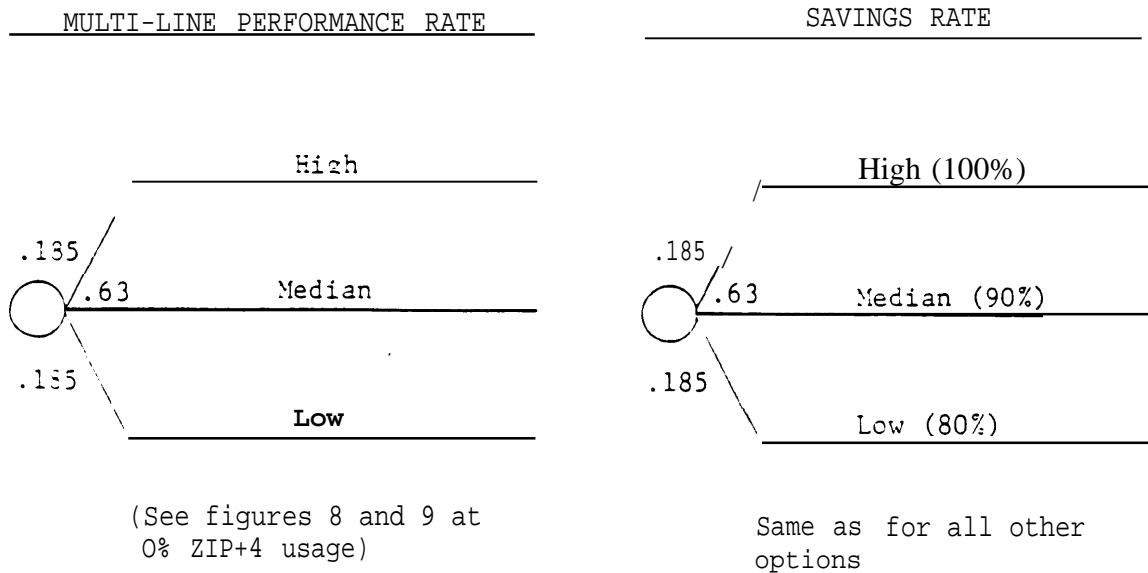
See figures 8 and 9)

Same as with  
single-line OCR

SOURCE: Office of Technology Assessment.

Figure A-5

Simplified Schematic Model  
for Option C: Multi-Line OCR Without ZIP+4

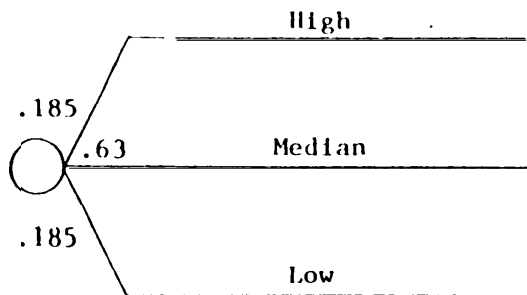


SOURCE: Office of Technology Assessment.

Figure A-6

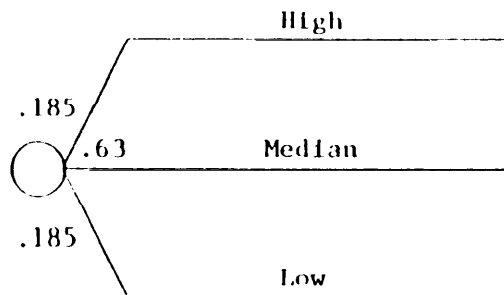
Simplified Schematic Model for  
Option D: Automatic Conversion

ZIP+4 USAGE



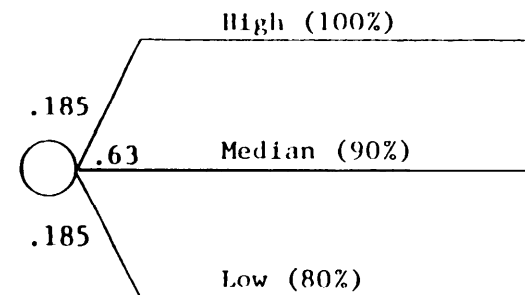
Same as for Single-Line or  
Multi-Line with ZIP+4

MULTI-LINE PERFORMANCE RATE



Same as for Multi-Line  
with ZIP+4

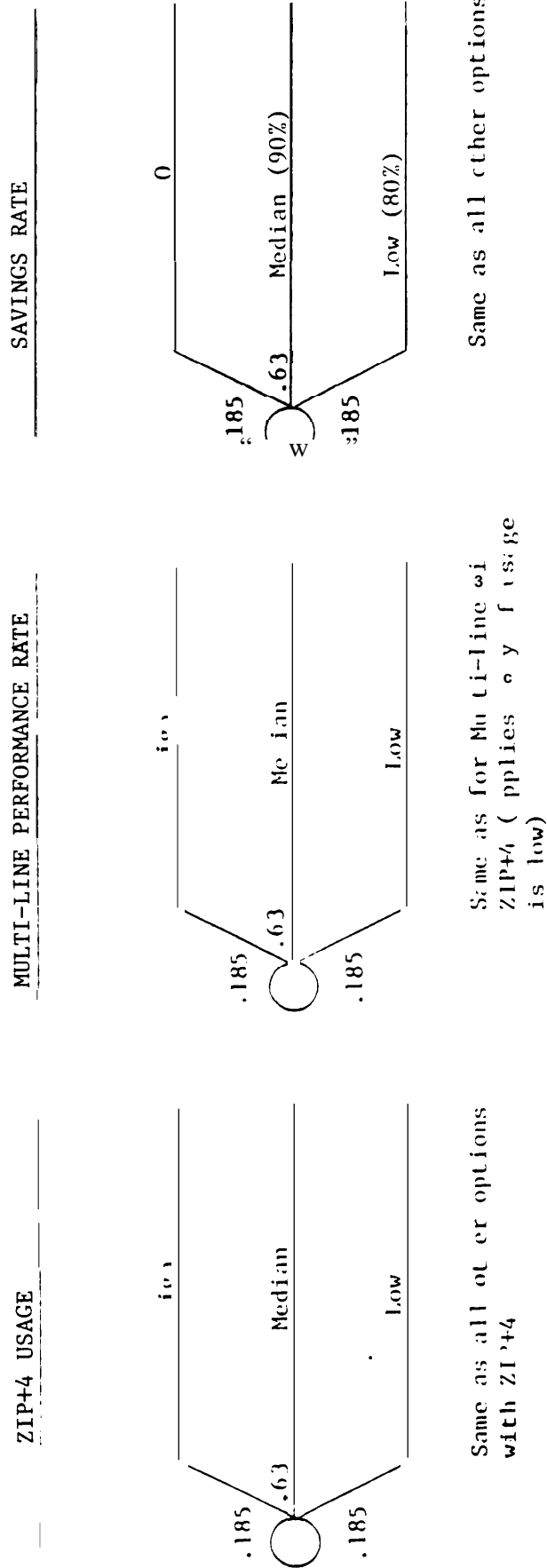
SAVINGS RATE



Same as for all the  
options

Figure A-7

Simplified Schematic Model for  
Option E: Hedge Conversion



SOURCE: Office of Technology Assessment.