**TRANSACTIONS OF SOCIETY OF ACTUARIES**
**1988 VOL. 40 PT 1**

# AMORTIZING ACQUISITION EXPENSES IN PROPORTION TO PREMIUM REVENUES

MARK D. J. EVANS

ABSTRACT

This paper examines several methods for dynamically adjusting expense assets to reflect differences between actual and expected persistency. The emphasis is on attempting to amortize acquisition expenses in proportion to emerging premium revenues. From this perspective the paper identifies some shortcomings of the traditional dynamic method and other published methods. The paper discusses some methods not previously reported in the actuarial literature that achieve some success in removing these shortcomings. The paper does not suggest a single method which is best in every circumstance, but explores the advantages and disadvantages of various dynamic adjustment methods under different test situations and from different perspectives. Analysis of the results demonstrates that some methods in use today should probably be discarded. The analysis also facilitates selection of an appropriate method suited to the actuary's defined objectives and perspectives. For example, primary emphasis on the balance sheet may conflict with primary emphasis on the income statement. It is hoped that the methods described in this paper will serve as a basis for further research in this area.

## 1. INTRODUCTION

This paper examines different methods of GAAP deferred acquisition expense amortization. The purpose of this paper is not to suggest a method which is superior in all instances, but to explore the relative advantages and disadvantages of various methods under different situations and perspectives. The dynamic technique mentioned in actuarial literature adjusts the expense asset by the ratio of actual to expected premium in-force. At issue the expense asset is calculated so that if actual experience is equal to expected, then the amount required to amortize the expense asset periodically will be a level percentage of premium, say $K$ percent. Under the traditional dynamic technique, if in any period actual persistency differs from expected persistency, the asset will be adjusted as mentioned above. From that point forward, if actual terminations equal expected terminations, the amount required to amortize the expense asset will be $K$ percent of the premium. The period containing the deviation from expected will have amortization produced by

the traditional dynamic method; that amortization can be quite large if actual terminations exceed expected or quite small if actual terminations are less than expected. However, amortizing acquisition expenses in proportion to premium revenues should produce a smoother earnings pattern. In purely mathematical terms, the goal is to develop a dynamic amortization process producing amortization that is a level percentage of premium income. Thus, this paper addresses the same concerns as Pharr [1].

This paper deals exclusively with approaches that modify results produced by a static amortization schedule to reflect either actual premium revenues or actual premium in force as compared to those expected in the construction of the static amortization schedule. The paper stops short of adjusting for differences between actual and expected interest. To do so would be inconsistent with current GAAP benefit reserve techniques, since GAAP benefit reserve factors are applied to actual in force, thus adjusting for differences between actual and expected persistency but not adjusting for differences between actual and expected interest. To adjust for interest in the expense asset would be logical only if similar adjustments in benefit reserve were made. Redefining GAAP benefit reserves is beyond the scope of this paper.

A total of twelve dynamic adjustment methods are explored. Some have previously appeared in the literature; some have been developed by others but to the best of my knowledge have not been previously published; and some I have developed. Each dynamic adjustment method is compared to a standard referred to as Eventual Perfect Hindsight (EPHS). The EPHS standard is simply what the asset would be if the static schedule had been based on the actual persistency experience. In other words, this hypothetical schedule would be calculated at the end of the amortization period (the amortization period in the tests used in this paper is 25 years) rather than at the time of issue.

The amortization schedule produced by the EPHS standard is the perfect solution. However, until actuaries have access to a crystal ball, it is impossible to develop a perfect solution. A given method will work better than other methods in certain situations and worse in other situations. No magical formula or algorithm can be demonstrated as the best approach by classic means. Methods must be observed over a wide range of scenarios, and statistics gathered and thoughtfully analyzed. Then a set of criteria (which may vary, depending on one's perspective) must be established to measure the results against. The method used in a given situation can then be selected based on judgment and practical considerations, but will not be the result of classic analytical techniques.

This paper uses two static schedules — one for acquisition expenses incurred entirely at the point of issue and one for a set of hypothetical heaped renewal commissions. Both of these schedules use a common expected persistency. The various dynamic adjustment methods are tested by using different actual lapse scenarios. The various methods are then compared to determine their relative strengths and weaknesses.

The dynamic adjustment methods are defined in Section II, first with a brief conceptual overview of the methods, followed by detailed definitions, including formulas. Section III describes five hypothetical lapse scenarios that are analyzed in detail and an additional 900 lapse scenarios generated by Monte Carlo techniques. The behavior of the various dynamic techniques under the lapse scenarios is described and analyzed in Section IV, first for the five hypothetical lapse scenarios and then for the Monte Carlo–generated lapse scenarios. Section V summarizes the findings of the study by identifying what methods work best for a given perspective or set of objectives. Appendix 1 gives an example of one of the dynamic methods. Appendix 2 gives the numerical test results of the initial five scenarios in detail. Appendix 3 summarizes the numerical test results of the Monte Carlo simulations.

## II. DEFINITION OF DYNAMIC ADJUSTMENT METHODS

Of the twelve dynamic adjustment methods considered, some fall into groups or "families" of methods. The first approach discussed is the traditional dynamic approach. The next approach involves annual recalculation of the amortization schedule. Third, the modified family of methods is discussed. The methods in this group use arithmetic or exponential smoothing formulas applied to actual-to-expected in-force ratios to produce the dynamic asset. Fourth, the revenue family of methods is discussed. These methods are based on comparisons of actual and expected premium revenues. The last group is the annuity family of methods, which annuitizes deviations over the remainder of the amortization period.

Following is a list of symbols used in the formulas of the various dynamic adjustment methods considered in the paper:

$\mathcal{P}_t^E$ = Expected premium in force at the end of year $t$.

$\mathcal{P}_t^A$ = Actual premium in force at the end of year $t$.

$R_t = \dfrac{\mathcal{P}_t^A}{\mathcal{P}_t^E}$ ($R_t = 1$ for $t = 0$).

$A_t^E$ = Static asset at the end of year $t$, based on $\mathscr{E}_t^E$.

$A_t^A$ = Reported actual asset at the end of year $t$.

$$R_t' = \frac{A_t^A}{A_t^E}$$

$i_t$ = Interest rate during year $t$.

$$V_t = \frac{1}{1 + i_t}.$$

$$\ddot{a}_t^E = \sum_{s=0}^{w-t-1} \frac{\mathscr{E}_{t+s}^E}{\mathscr{E}_t^E} \prod_{r=0}^{s} V_r, \; V_0 = 1.$$

All the formulas developed in this paper are on a policy year basis and assume annual payment of premiums.

*Traditional Dynamic Approach*

The traditional dynamic approach, henceforth designated the FULL method, preserves the level of expense premium to gross premium originally intended at issue, assuming that future actual persistency will reproduce future expected persistency. With this method, any adjustments between actual and expected experience are entirely reflected in the current year. As a result, highly erratic amortizations can result that are not proportionate to premium revenue. In some environments the actuary may be more concerned about preserving future profit margins than producing amortizations that are in proportion to premium revenue. In such instances it is appropriate to use the FULL method. The formula for this method follows:

**FULL:** $$A_t^A = R_t A_t^E \tag{1.1}$$

*Retrospective Annual Recalculation Method*

The retrospective annual recalculation (RAR) method, introduced by Goldberg and Moskowitz, involves the calculation of twenty-five separate amortization schedules. At the end of each year a new amortization schedule is calculated by using actual persistency for past years, for which the experience is known, and using the original expected persistency for future years. The RAR method may involve practical limitations since it requires

recalculation of the amortization schedules annually for each issue year. The EPHS standard measures the ability of a dynamic adjustment method both to reflect past actual experience and to anticipate future actual experience to some extent, whereas the RAR method reflects prior deviations from expected. Although the ideal situation would be for the dynamic adjustment method to exactly reproduce the EPHS standard, one can argue that it is unreasonable to expect a dynamic adjustment method to produce results that are superior to the RAR method, since to do so would require the dynamic adjustment method to have psychic characteristics.

Thus, one might take the view that the RAR method itself should be a standard. The main goal of this paper, however, is to develop methods that produce acquisition expense amortizations that are a level percentage of premium revenues, and therefore the emphasis is on finding a dynamic method that over a large number of situations comes the closest to reproducing the EPHS standard.

*Modified Family*

The following three formulas fall into what can be described as the modified family of dynamic adjustment methods. The first of these was developed and is practiced in an effort to avoid the theoretical and practical limitations of the FULL method. This method will henceforth be referred to as the MOD method. The formula for this method follows:

$$\textbf{MOD:} \quad R'_{3t+s} = 1/3\,[s \cdot R_{3t} + (1 - s)\,R_{3t-3}] \qquad (2.1)$$

$$t = 0, 1, 2, \ldots$$

$$s = 1, 2, 3$$

This formula looks at the ratio of actual to expected in-force premium at the end of every third year. This ratio is not used in calculating the current year's asset, but is reflected over the subsequent three years. The development of this approach involves justifications beyond the scope of this paper. It is shown here only because actual experience with it led to the use of the other methods of this family. An example calculation is given in Appendix 1.

The MOD2 method, considered next, is described by the following formula:

$$\textbf{MOD2:} \quad R'_t = 1/3\,(R_{t-2} + R_{t-1} + R_t) \qquad (3.1)$$

With this method, the static asset is simply multiplied by the average of the actual to expected in-force premium for the current and two previous years.

The last member of the modified family is the MOD3 method. Both the MOD2 and the MOD3 methods were developed by me as a result of observations of the MOD method. The formula for the MOD3 method follows:

**MOD3:** $$R'_t = 1/3\, R_t + 2/3\, R'_{t-1} \tag{4.1}$$

This formula is simply a weighted average of the current ratio of actual to expected in-force premium and the previous year's ratio of dynamic asset to static asset.

The intent of the MOD family of methods is to cushion the extremely volatile effects of the FULL method by spreading the differences between actual and expected persistency experience over more than one year. MOD2 produces a moving average related to the FULL method asset. MOD3 moves one-third the distance between where the asset was a year previously and where it would be with the FULL method. In other words, it amortizes one-third as much as the FULL method. Thus, the MOD2 method is directed more toward the asset, while MOD3 is directed more toward amortization. This will be demonstrated in the numerical examples in this paper.

*Revenue Family*

The revenue family of dynamic adjustment methods bases the adjustment on the comparison of actual premium revenue with expected premium revenue. The first of these methods is the adjusted revenue method (ARM), developed by Pharr:

**ARM:** $$R'_t = \left(\sum_{s=0}^{t-1} \mathscr{E}_s^A\right) \div \left(\sum_{s=0}^{t-1} \mathscr{E}_s^E\right) \tag{5.1}$$

Here Pharr's method has been adjusted to reflect the assumption of annual premiums and a policy year basis.

The next method of this family is the modified adjusted revenue method (MARM), developed by Goldberg and Moskowitz. This formula is described as follows:

**MARM:** Let $A_t^Z$ = recalculated static asset assuming $\mathscr{E}_t = 1$ for all $t$ but using the same interest and commission scale assumptions as used to calculate $A_t^e$:

$$A_t^A = A_t^E + (A_t^Z - A_t^E) \times \left(\sum_{s=0}^{t-1} \mathscr{E}_s^A - \mathscr{E}_s^E\right) \times \frac{1}{t} \tag{6.1}$$

The next method of this family is the LEVEL method developed, but not previously published, by Chris Sicaras:

$$\textbf{LEVEL:}\quad R'_t = \left\{R_t \cdot \left(\sum_{s=t}^{w-1} \mathcal{E}_s^E\right) \div \left[\left(\sum_{s=0}^{t-1} \mathcal{E}_s^A\right) + R_t \cdot \sum_{s=t}^{w-1} \mathcal{E}_s^E\right]\right\} \div \left[\left(\sum_{s=t}^{w-1} \mathcal{E}_s^E\right) \div \sum_{s=0}^{w-1} \mathcal{E}_s^E\right] \tag{7.1}$$

This formula involves dividing the "actual future ratio" by the "expected future ratio," if you will. The expected future ratio at the end of any given year is the future premium that would be generated by the expected persistency divided by the total premiums expected to be collected over the entire amortization period. The actual future ratio is similarly calculated, except it is adjusted to reflect actual premium collection experience. It is equal to the future premium based on expected persistency, but adjusted to reflect the actual in-force divided by the expected in-force premium. This future premium is then divided by the sum of itself plus past actual premium collections. This method can be said to compare the actual proportion of premiums yet to be collected with the expected proportion of premiums yet to be collected, while assuming the asset should be related to the proportion of premiums yet to be received to the total premium. This concept is consistent with the desire to amortize deferred acquisition expenses as a level percentage of premium revenues, thus the method's name.

The last method of this family is the LVLPV method. This is equal to the level method adjusted to reflect the time value of money. The formula for this method follows:

$$\textbf{LVLPV:}\quad R'_t = \left[\left[R_t \cdot \left[\sum_{s=t}^{w-1} \mathcal{E}_s^E (1+i_s) \prod_{r=t}^{s} V_r\right] \div \left\{\left[\sum_{s=0}^{t-1} \mathcal{E}_s^A \cdot \prod_{r=s+1}^{t} (1+i_t)\right] + R_t \cdot \sum_{s=t}^{w-1} \mathcal{E}_s^E (1+i_s) \prod_{r=t}^{s} V_r\right\}\right]\right]$$

$$\div \left[ \left( \sum_{s=t}^{w-1} \mathcal{C}_s^E \prod_{r=0}^{s} V_r \right) \div \left( \sum_{s=0}^{w-1} \mathcal{C}_s^E \cdot \prod_{r=0}^{s} V_r \right) \right] \tag{8.1}$$

If all acquisition expenses occur at the point of issue, then the LVLPV and RAR methods give the same result.

*Annuity Family*

The annuity family of dynamic adjustment methods was developed by me. The intent of these methods is to spread current year deviations between actual and expected over the remaining life of the amortization period, in hopes of producing superior matching of amortization with premium revenue. The first method is referred to as the ANN1 method. It is described by the following formulas:

**ANN1:**

$$P_t^E = A_t^A \div \ddot{a}_t^E \tag{9.1}$$

$$P_t^A = A_t^A \div \left( 1 + \frac{\mathcal{C}_{t+1}^A}{\mathcal{C}_t^A} \cdot V_{t+1} \cdot \ddot{a}_{t+1}^E \right) \tag{9.2}$$

$$A_{t+1}^A = A_t^A \times \frac{A_{t+1}^E}{A_t^E} + (P_t^E - P_t^A)(1 + i_{t+1}) \tag{9.3}$$

Formula (9.1) calculates the expense premium required to amortize the reported actual asset at the end of year $t$ over the remaining life of the amortization period. Formula (9.2) must be calculated at the end of year $t + 1$. It is similar to formula (9.1) except that the annuity factor has been recalculated to reflect the actual persistency experience during year $t + 1$. Finally, formula (9.3) produces the ending asset for year $t + 1$ by taking the previous year's asset adjusted by the static amortization rate plus a correction factor reflecting the difference between the expected base premium and the actual base premium.

The major limitation of the ANN1 method is that it adjusts for a portion of the current year's deviation but makes no provision for the previous year's deviation. If the actual and expected in-force values are not close, this method can produce disappointing results. Numerical examples utilized later in the paper will demonstrate this.

The second member of this family of dynamic adjustment methods is the ANN2 method, described by the following formulas:

**ANN2:**
$$P_t^E = R_t \cdot A_t^E \cdot \frac{1}{\ddot{a}_t^E} \tag{10.1}$$

$$P_t^A = A_t^A \div \left(1 + \frac{\ell_{t+1}^A}{\ell_t^A} \cdot V_{t+1} \cdot \ddot{a}_{t+1}^E\right) \tag{10.2}$$

$$A_{t+1}^A = A_t^A \times \frac{A_{t+1}^E}{A_t^E} + (P_t^E - P_t^A)(1 + i_{t+1}) \tag{10.3}$$

ANN2 is similar to ANN1 except that in calculating the expected base premium, ANN2 uses the static asset times the actual to expected in-force ratio, rather than the beginning reported actual asset. The ANN2 method converges with the FULL method, but spreads the convergence over the remaining lifetime of the amortization period. This causes the method to recognize deviations from previous years, avoiding the shortcoming of the ANN1 method.

The last member of this family is the ANN3 method, described by the following formulas:

**ANN3:**
$$P_t = V_{t+1}\,[(R_t' \cdot A_t^E - R_{t+1} \cdot A_{t+1}^E) - R_t'\,(A_t^E - A_{t+1}^E)] \div \left(1 + \frac{\ell_{t+1}^A}{\ell_t^A} \cdot V_{t+1} \cdot \ddot{a}_{t+1}^E\right) \tag{11.1}$$

$$A_{t+1}^A = \frac{A_{t+1}^E}{A_t^E} \cdot A_t^A - P_t\,(1 + i_{t+1}) \tag{11.2}$$

In formula (11.1), the amount in the brackets can be explained as the difference between $A$ and $B$, where $A$ is equal to the reported actual asset at the beginning of the year less what the asset would be at the end of the year with the FULL dynamic adjustment method, and $B$ is what the amortization would be under this method for the year if the asset was amortized at the amortization rate used in the original static schedule. In other words, this method takes the excess of the amortization called for by the FULL method over that called for by the static method and spreads the difference over the remaining life of the amortization period.

## III. LAPSE SCENARIOS

Five lapse scenarios were analyzed in detail to illustrate the mechanics of the various dynamic methods. In addition to these five scenarios, an additional 900 lapse scenarios were generated using Monte Carlo simulation

models. Due to the sheer magnitude of the data generated, the results have been summarized. The Monte Carlo tests were performed to provide some statistical testing of the various methods. A direct statistical analysis exceeds my capabilities. Perhaps future research in this area would be interesting.

The scenarios used for testing the various dynamic adjustment methods include five different sets of actual termination rate scenarios. For each scenario, two types of amortization schedules are produced. The first assumes that all acquisition expenses occur at the point of issue. The second assumes that first-year commissions are deferred in addition to renewal commissions in years two through five. This schedule would be appropriate in a situation where for each year the first-year commissions were precisely accounted for and deferred, while the renewal commissions were not explicitly deferred but were implicitly deferred through the reflection of the average relationship between the renewal and first-year commissions. These two different types of deferrals will be referred to as "OTHER" and "commissions," abbreviated as "COMMS."

The total expected terminations used in constructing the static amortization schedules are intended to reflect premium in-force terminations. The five different scenarios for total actual terminations are described below.

*Test Description*

A. 110% lapse: Each year's expected termination rate has been multiplied by 1.1.

B. +5% lapse: Each year's termination rate has been increased by 5%.

C. 5% + 110% lapse: Each year's expected termination rate has been multiplied by 1.1. The product has then been increased by 5% to produce the actual termination rate.

D. +30% DUR 10: The termination rate in the tenth policy year has been increased from 10.4% to 40.4%.

E. 110% for 5, 80% for 10, 120% for 10: Under this scenario the actual termination rates oscillate around the expected termination rates. The termination rates for year 1 through 5 are multiplied by 1.1, for years 6 through 15 by 0.8, and for years 16 through 25 by 1.2.

In order to gain further insight into the behavior of various dynamic methods and to obtain statistical analysis capabilities, a Monte Carlo simulation model was constructed. The model accepts various lapse deviation ranges. Lapse deviations within these ranges are simulated by random numbers. The general model is described by the following formula:

$$W_t^A = W_t^E + e_t$$

where $W_t^A$ = simulated actual lapses, $W_t^E$ = expected lapses to calculate amortization schedule, and $e_t$ = lapse deviation generated by a random number within a specified range.

Using this general model, the following nine simulations were generated. Random numbers were used to generate 100 simulated sets of 25 durations of actual lapses for each of the nine simulations. The random numbers produced values uniformly distributed within the range of $e_t$.

*Simulation 1:*

Random oscillation,

$$-7\% \leq e_t \leq 7\%,$$

with the restriction that $W_t^A \geq 2\%$.

*Simulation 2:*

Random oscillation,

$$-\max(2\%, 0.1 \times W_t^E) \leq e_t \leq \max(2\%, 0.1 \times W_t^E),$$

with the restriction that $W_t^A \geq 2\%$.

*Simulation 3:*

Cumulative random oscillation,

$$-\max(0.5\%, 0.05 \times W_t^E) \leq e_s \leq \max(0.5\%, 0.05 \times W_t^E),$$

$$e_t = \sum_{s=1}^{t} e_s.$$

*Simulation 4:*

Random deterioration,

$$0 \leq e_t \leq 6\%.$$

*Simulation 5:*

Random deterioration,

$$0 \leq e_t \leq \max\,(2\%,\ 0.2 \times W_t^E).$$

*Simulation 6:*

Cumulative random deterioration,

$$0 \leq e_s \leq \max\,(4\%,\ 0.03 \times W_t^E),$$

$$e_t = \sum_{s=1}^{t} e_s.$$

*Simulation 7:*

Random improvement,

$$-6\% \leq e_t \leq 0,$$

with the restriction that $W_t^A \geq 2\%$.

*Simulation 8:*

Random improvement,

$$-\max\,(2\%,\ 0.2 \times W_t^E) \leq e_t \leq 0.$$

*Simulation 9:*

Cumulative random improvement,

$$-\max\,(0.2\%,\ 0.02 \times W_t^E) \leq e_s \leq 0,$$

$$e_t = \sum_{s=1}^{t} e_s.$$

So 22,500 simulated actual lapse rates were generated (9 simulation models × 100 simulations/model × 25 durations). Rather than include the results of 900 simulations and print 22,500 lapse rates, I have summarized the results in Appendix 3.

The lapse rates are summarized in the tables titled "Statistical Summary of Simulated Actual Lapses." The behavior of the various simulations was measured by looking at the mean and standard deviation of the resulting 100 randomly generated lapse rates for each year. The theoretical mean was based on the expected value of $E_t$, given the range specified for the simulation. The theoretical standard deviation was calculated based on the differences between the simulated actual lapse rates and the theoretical mean for each year. The same calculations were then performed assuming no knowledge of the formula generating the simulated actual lapses under the "Sample" heading in the tables.

The lowest and highest simulated actual lapses produced are also shown. The results of using the 100 simulated actual lapse scenarios were then summarized by adding together the statistics produced by each simulation. A summary of each simulation model's results is given in Appendix 3.

I tried to choose actual termination assumptions that would test the various dynamic adjustment methods under a wide range of possible situations.

The effect on GAAP benefit reserves of actual persistency different from expected persistency was also analyzed. Benefit reserves are not nearly as sensitive to persistency assumptions as are expense assets. It was assumed that GAAP benefit reserves are to be calculated by the conventional method on a factor basis and applied to actual in-force policies. Since deviations in lapse experience in relation to GAAP benefit reserves are largely offset by surrender values, I did not investigate alternative methods of adjusting GAAP benefit reserves.

However, analyzing the interaction of the expense asset and GAAP benefit reserve under various dynamic adjustment methods produces some useful information. If a particular dynamic adjustment method tends to overstate the expense asset, then one would want the GAAP benefit reserve to be overstated by a similar amount to obtain an accurate measure of net worth. Similarly, a particular dynamic adjustment method understating the asset should be associated with an understated GAAP benefit reserve. Since reserve increases and expense amortizations both serve as reductions to income, if one is overstated, the other should be understated.

The relative magnitude of these deviations depends on many factors, including the relationship between the GAAP benefit premium and the amortization expense premium. Such factors will vary widely in practice. Nonetheless, comparisons were made regarding the differences between dynamically adjusted results and the EPHS method. These comparisons for the expense asset are thoroughly explained elsewhere in this paper. The difference between the reported reserve can be expressed as $C - D$, where $C$ is based on reserve factors calculated using expected persistency and $D$ is based on reserve factors calculated using actual persistency obtained from eventual perfect hindsight. No attempt was made to compare magnitudes because of the limitations cited above, but the directions of the differences were compared. If the errors offset one another, a result of $+1$ was assigned. If the errors compounded one another, a result of $-1$ was assigned. Any other result was assigned a value of 0. These "directional" values were summed for all durations for scenarios A through E and simulations from the Monte Carlo test.

## IV. TEST RESULTS

### *Results for Five Lapse Scenarios*

Appendix 2 consists of computer-generated reports for each of the five lapse scenarios. Each lapse scenario is analyzed separately in the sequence described in the preceding section. Four different report formats are used to present the information. The reports labeled "Input for Dynamic Method Comparison Tests" are straightforward. Those labeled "Dynamic Method Comparison Tests — Asset" and "Dynamic Method Comparison Tests — Amortization" are constructed as follows: The top half of the report gives the asset (or amortization) calculated on a static method, the EPHS standard, and twelve dynamic adjustment methods. The lower half of the report calculates the various methods' assets and amortizations as a percentage of the EPHS standard.

A second format is used in the reports labeled "Statistical Summary of Dynamic Methods Compared to EPHS." Here the various dynamic methods are compared to the EPHS standard, using some familiar statistical calculations. The rows labeled "DIFF" are simply the sum of the differences between either the amortizations or assets. The rows labeled "ABS(DIFF)" are derived the same way except that the absolute value of each difference is used. The rows labeled "DIFF*2" are the sum of the differences squared.

A third format is used for reports labeled "Rank of Statistical Summary of Dynamic Methods Compared to EPHS and RARS." These reports rank

the different methods, with 1 as the best possible ranking and 12 as the worst possible ranking. The rank was calculated as the relative ranking of each method's sum-of-square statistic, plus 10% of any difference between the relative ranking of the sum of the absolute value of the difference statistic and the relative ranking of the sum of squares statistic. This criterion is arbitrary, but is intended to put relatively more weight on large deviations. One can see from these results that no one method works best in every situation.

Comments about the behavior of each method with respect to the expense asset and amortization follow.

The FULL method performs extremely well in some circumstances and quite poorly in others. It performs well when the continuing trend of actual to expected persistency remains constant, as in tests A, B, and C. In tests B and C, the FULL method produces the best results when compared to the EPHS standard. For these lapse scenarios the FULL method is far superior to any other method when judged against the EPHS standard. This is to be expected, since the FULL method reacts very quickly to any difference between actual and expected and is therefore better able to anticipate continued large differences between actual and expected as long as those differences have about the same magnitude and the same sign. On test D, however, the FULL method produces an amortization in the tenth year, the year of the spike, that is about three times that which would be proportional to the premium revenue in that year. This example illustrates the greatest disadvantage of the FULL method. The FULL method is also inferior to the other methods under scenario E because it anticipates the continuation of trends that later reverse. The FULL method works well for the asset when judged against the EPHS standard. It performs better with COMMS than OTHER relative to other methods.

The modified family of dynamic adjustment methods tends to do relatively better with the COMMS schedule than with the OTHER schedule. This is because theories underlying the revenue family and (perhaps to a lesser extent) the annuity family, more so than the theories underlying the FULL method or the modified family of methods, implicitly assume that all expenses are incurred at the point of issue.

The MOD method performs poorly in nearly every circumstance, because of the three-year lag in recognizing differences between actual and expected experience. The MOD method generates catch-up situations where amortizations must be adjusted to reflect deviations that occurred a few years ago, thus causing frequent mismatches between amortization and premium. This

is a serious disadvantage to this method. The MOD2 and MOD3 methods, however, work fairly well, with the MOD3 method performing slightly better in the aggregate with respect to the five scenarios.

The formulas the MOD2 and MOD3 methods are based on spread, to some extent, the effect of the deviations, helping to obtain a better match between expense amortizations and revenues than is obtainable by the FULL method, and yet do not contain the lag present in the MOD method. The modified family of methods do have some element of the anticipation characteristic present in the FULL method, which is why they do not perform quite as well in scenario E, where the actual to expected ratio oscillates.

Among the revenue family of dynamic adjustment methods, the results suggest that the LEVEL method is a significant improvement over the ARM and MARM methods. The LVLPV method is superior to the LEVEL method. The tests used in this paper show extreme problems with the ARM and MARM methods. For example, under lapse scenario B, at the later durations the asset and the amortizations under the ARM and MARM methods are about twice what they should be. A similar problem with these two methods is evident under scenario C and, to a lesser extent, under scenario D. The LEVEL and LVLPV methods produce respectable results under lapse scenarios A, B, and C, and excellent results under the oscillating scenario E. They show a severe problem, however, under scenario D: like the FULL method, they amortize an amount in the tenth duration that is far in excess of that which would be proportional to the revenue in that duration.

With the exception of the ANN1 method, the annuity family of methods performs better than the revenue family of methods. The ANN1 method does a fair job of looking at the current year's deviation and calculating an appropriate amount of amortization for that year. Unfortunately, the nature of that formula is such that the resulting asset tends slowly to drift away from what can be considered reasonable. This is particularly evident if one observes the asset pattern for ANN1 under scenarios B and C. To correct this deficiency, ANN2 and ANN3 reflect the current relationship between actual in force and expected in force but spread the effect over the future premiums. In general, the ANN2 and ANN3 methods produce good results under a wide range of alternative scenarios and do not perform poorly under any of the scenarios tested.

With respect to the interaction of the expense asset and benefit reserve, the MOD2 method performs the best. The MOD, MOD3, and ANN2 methods also perform well in all scenarios. The FULL and ANN3 methods usually

perform well. The ARM, MARM, LEVEL, and ANN1 methods perform poorly.

The MOD3 method exhibits the best interaction between amortization and benefit reserve increase. The RAR, MOD, LVLPV, and ANN2 methods also perform well in this respect in all scenarios. The MOD2 and ANN3 methods usually perform well. No methods perform poorly overall.

*Results of Monte Carlo Simulations*

Analysis of five lapse scenarios permits a basic appreciation of how the different dynamic methods behave under various circumstances. However, the Monte Carlo simulation results provide a more thorough and rigorous analysis of situations.

The summaries of the Monte Carlo simulations yield some interesting information. First the results of each simulation will be discussed; then some summaries of the nine simulations will be discussed; and finally each method's performance will be analyzed.

Simulation 1 involves random oscillating deviations. Since the FULL method and the MOD family of methods tend to anticipate further deviations, they do not handle the asset as well with this simulation as they do with other simulations. The RAR, LEVEL, and LVLPV methods handle the asset well. The annuity family of methods handles the amortization well. The ANN1 method works quite well here, since the absence of prior year deviation correction in this method is not as important in a random oscillating deviation situation.

Simulation 2 also involves random oscillation and thus produces similar results to simulation 1.

Simulation 3 involves cumulative random oscillation. Thus the anticipating characteristics of the FULL, MOD2, and MOD3 methods allow them to perform well. The ARM, MARM, and ANN1 methods perform poorly. The MOD method reasonably handles the asset but does not handle the amortization well.

Although simulation 4 involves random deterioration, it yields results similar to simulation 3.

Simulation 5 also involves random deterioration, but with a different pattern. It yields different results than simulation 4. The ANN2, MOD3, and ANN3 methods handle the OTHER expense asset well, while the ANN1, MARM, and FULL methods do poorly. The MOD3, ANN3, RAR, LVLPV, and ANN2 methods handle the OTHER expense amortization well, while

the MOD, FULL, ARM, and MARM methods perform poorly. The FULL method has a tendency to overreact under this simulation. The MOD3, MOD2, and FULL methods handle the COMMS expense asset well, while the ANN1, LEVEL, MARM, and ARM methods perform poorly. The MOD3, ANN2, ANN3, and RAR methods handle the COMMS expense amortization well, while the MOD, MARM, and ARM methods perform poorly.

Simulation 6 involves cumulative random deterioration. The FULL, MOD2, MOD3, RAR, and LVLPV methods handle the OTHER expense and COMMS assets well, while the MARM, ARM, and ANN1 methods perform poorly. The FULL, MOD2, MOD3, RAR, and LVLPV methods handle the OTHER expense and COMMS amortizations well, while the MARM, ANN1, ARM, and MOD methods perform poorly. The FULL method does significantly better than the others because it anticipates further deterioration.

Simulation 7 involves random improvement. The FULL, MOD2, and MOD3 methods handle the OTHER expense asset well while the MARM, ANN1, ARM, and LEVEL methods perform poorly. The MOD3, MOD2, and FULL methods handle the OTHER expense amortization well while the MOD, MARM, ANN1, and ARM methods perform poorly. The COMMS show similar results except that the ANN3 and LVLPV methods also perform poorly with the asset.

Simulation 8 also involves random improvement but yields different results than simulation 7. The ANN2, ANN3, MOD3, RAR, and LVLPV methods handle the OTHER expense asset well, while the ANN1, MARM, and FULL methods perform poorly. The MOD3, ANN3, ANN2, RAR, and LVLPV methods handle the OTHER expense amortization well, while the MOD, FULL, ARM, and MARM methods perform poorly. The MOD3, MOD2, ANN2, and FULL methods handle the COMMS asset well, while the ANN1, LEVEL, MARM, and ARM methods perform poorly. The MOD3, RAR, ANN2, and ANN3 methods handle the COMMS amortization well, while the MOD, MARM, ANN1, and LEVEL methods perform poorly.

Simulation 9 involves cumulative random improvement. The FULL, MOD2, and MOD3 methods handle the OTHER expense and COMMS assets well, while the ANN1, MARM, and ARM methods perform poorly. The FULL, MOD2, MOD3, RAR, and LVLPV methods handle the OTHER expense and COMMS amortizations well, while the ANN1, ARM, and MARM methods perform poorly.

Obviously, no one method works the best in all situations, but two additional reports help capsulize the simulation results. The first report is titled "Average of Summary of Nine Monte Carlo Simulations." For each method

it shows the average of the statistics from the nine simulations; each statistic shown is the sum of the corresponding items from the nine statistical summaries divided by nine. The second report is titled "Average Relative Performance Under Nine Simulations." This report was generated because under some of the situations, all methods generated large statistics. This could give too much weight to such situations in the average calculations and allow the method that performed best in a given situation to dominate the results obtained by a straight average. The second report normalizes the results of each summary by calculating the average of each statistic for the dynamic methods. Then that statistic for each method is expressed as a percentage of said average. Finally, the percentages are averaged across the nine simulations to produce the report.

For the OTHER expense asset, the two reports produce different conclusions. Under the straight average, the FULL method performs the best, with MOD2 and MOD3 performing nearly as well. Thus, these methods perform at least reasonably in all situations. Based on average relative performance, the RAR, LVLPV, and MOD3 methods perform the best. The ANN1, MARM, and ARM methods perform the worst by both measures. For OTHER expense amortization, both reports demonstrate that the MOD3 method performs the best. The ANN3 method is second best, with the ANN2 method performing nearly as well. The MOD and FULL methods perform quite poorly, while the ARM and MARM methods perform worse than average.

The conclusions for the COMMS expense asset are similar to those of the OTHER expense asset, except that based on average relative performance, the MOD2 method performs best, with the MOD3, FULL, and RAR methods performing nearly as well. The results for the COMMS expense amortization are similar to those of the OTHER expense amortization.

With respect to the interaction between the benefit reserve dynamics and the OTHER expense asset dynamics, the MOD2, FULL, and MOD3 methods work best. The ANN2, MOD, and ANN3 methods also work well. Comparing the reserve change and OTHER expense amortization, the FULL method is the best. The RAR, LVLPV, and MOD3 methods perform well. The MOD2, LEVEL, ANN2, and ANN3 perform reasonably well. The COMMS expense asset interacts best with the benefit reserve under the FULL, MOD2, and MOD3 methods. The MOD, ANN2, and ANN3 methods also perform well. The reserve change and COMMS expense amortization interact best with the FULL method. The RAR, MOD3, and MOD2 methods also perform well. None of the methods shows a strong tendency

to interact poorly with the liability side of the balance sheet, but the ARM, MARM, LEVEL, and ANN1 methods are close to neutral.

## V. CONCLUSION

Although there are differences from situation to situation, in the aggregate the results are suggestive. If the primary emphasis is on the balance sheet, then the FULL method is the best choice. However, as observed by Pharr, the FULL method tends to overreact when determining amortizations, thus failing to produce reasonable income statement results. On the other hand, the MOD3 method does the best job with amortizations and is also roughly the third best method with respect to the asset. It also interacts well with reserves. All things considered, the MOD3 method is the best. If one has strong concern about the balance sheet but doesn't wish to be subjected to the problems of the FULL method, then the MOD2 method may be the answer. It does not perform as well as the MOD3 with respect to amortization, but does better with the asset.

Based on this work, the best choices for the actuary are the MOD3 and MOD2 methods; the FULL method is appropriate if one has little concern for income statement results. It is difficult for me to perceive reasons to use any other methods, but some concluding remarks are appropriate. The RAR (and thus LVLPV for OTHER expense), ANN2, and ANN3 methods perform adequately. The LEVEL and LVLPV (for COMMS expense) do not do quite as well. Based on the considerations used in this paper, the MOD, ARM, MARM, and ANN1 methods are not appropriate.

Some areas have not been addressed in this paper. The weighting factors of one-third and two-thirds used in the modified family of methods are somewhat arbitrary. Weights of one-fourth, three-fourths and one-half, one-half were tried, but were inferior to the one-third, two-thirds weights.

Although the formulas and concepts developed in this paper are based on a policy year basis and assume annual premiums, they are adaptable to calendar year reporting and other premium modes. All twelve dynamic adjustment methods are believed to be fairly practical to implement.

## REFERENCE

1. PHARR, J.B. "GAAP Acquisition Expense Amortization Methodology," *TSA*, XXX (1978): 169.

## APPENDIX 1

### EXAMPLE OF MOD

| Year | $R$ | $t$ | $s$ | $R^1$ |
|---|---|---|---|---|
| 0..... | 1.000 | | | |
| 1..... | 0.941 | 0 | 1 | $1/3\ [1 \cdot 1 + 2 \cdot 1] = 1$ |
| 2..... | 0.919 | 0 | 2 | $1/3\ [2 \cdot 1 + 1 \cdot 1] = 1$ |
| 3..... | 0.904 | 0 | 3 | $1/3\ [3 \cdot 1 + 0 \cdot 1] = 1$ |
| 4..... | 0.890 | 1 | 1 | $1/3\ [1 \cdot 0.904 + 2 \cdot 1] = 0.968$ |
| 5..... | 0.879 | 1 | 2 | $1/3\ [2 \cdot 0.904 + 1 \cdot 1] = 0.936$ |
| 6..... | 0.868 | 1 | 3 | $1/3\ [3 \cdot 0.904 + 0 \cdot 1] = 0.904$ |
| 7..... | 0.858 | 2 | 1 | $1/3\ [1 \cdot 0.868 + 2 \cdot 0.904] = 0.892$ |
| 8..... | 0.848 | 2 | 2 | $1/3\ [2 \cdot 0.868 + 1 \cdot 0.904] = 0.880$ |
| 9..... | 0.838 | 2 | 3 | $1/3\ [3 \cdot 0.868 + 0 \cdot 0.904] = 0.868$ |
| 10..... | 0.829 | 3 | 1 | $1/3\ [1 \cdot 0.838 + 2 \cdot 0.868] = 0.858$ |
| 11..... | 0.821 | 3 | 2 | $1/3\ [2 \cdot 0.838 + 1 \cdot 0.868] = 0.848$ |
| 12..... | 0.814 | 3 | 3 | $1/3\ [3 \cdot 0.838 + 0 \cdot 0.868] = 0.838$ |
| 13..... | 0.804 | 4 | 1 | $1/3\ [1 \cdot 0.814 + 2 \cdot 0.838] = 0.830$ |
| 14..... | 0.797 | 4 | 2 | $1/3\ [2 \cdot 0.814 + 1 \cdot 0.838] = 0.822$ |
| 15..... | 0.790 | 4 | 3 | $1/3\ [3 \cdot 0.814 + 0 \cdot 0.838] = 0.814$ |
| 16..... | 0.782 | 5 | 1 | $1/3\ [1 \cdot 0.790 + 2 \cdot 0.814] = 0.806$ |
| 17..... | 0.775 | 5 | 2 | $1/3\ [2 \cdot 0.790 + 1 \cdot 0.814] = 0.798$ |
| 18..... | 0.769 | 5 | 3 | $1/3\ [3 \cdot 0.790 + 0 \cdot 0.814] = 0.790$ |
| 19..... | 0.761 | 6 | 1 | $1/3\ [1 \cdot 0.769 + 2 \cdot 0.790] = 0.783$ |
| 20..... | 0.744 | 6 | 2 | $1/3\ [2 \cdot 0.769 + 1 \cdot 0.790] = 0.776$ |
| 21..... | 0.739 | 6 | 3 | $1/3\ [3 \cdot 0.769 + 0 \cdot 0.790] = 0.769$ |
| 22..... | 0.734 | 7 | 1 | $1/3\ [1 \cdot 0.739 + 2 \cdot 0.769] = 0.759$ |
| 23..... | 0.728 | 7 | 2 | $1/3\ [2 \cdot 0.739 + 1 \cdot 0.769] = 0.749$ |
| 24..... | 0.724 | 7 | 3 | $1/3\ [3 \cdot 0.739 + 0 \cdot 0.769] = 0.739$ |

# APPENDIX 2

## RESULTS OF SCENARIOS A THROUGH E

INPUT FOR DYNAMIC METHOD COMPARISON TESTS
110% LAPSE

| YEAR | TOTAL EXP. TERMINATIONS(%) | ENDING EXPECTED L(T) | TOTAL ACT. TERMINATIONS(%) | ENDING ACTUAL L(T) | INTEREST (%) | COMMISSION (%) |
|---|---|---|---|---|---|---|
| 1 | 37 | .63 | 40.7 | .593 | 7.500 | 55.0 |
| 2 | 19.1 | .5097 | 21.01 | .4684 | 7.500 | 20.0 |
| 3 | 14.8 | .4342 | 16.28 | .3922 | 7.500 | 10.0 |
| 4 | 12.6 | .3795 | 13.86 | .3378 | 7.500 | 9.0 |
| 5 | 11.5 | .3359 | 12.65 | .2951 | 7.500 | 8.0 |
| 6 | 10.9 | .2993 | 11.99 | .2597 | 7.500 | .0 |
| 7 | 10.3 | .2684 | 11.33 | .2303 | 7.500 | .0 |
| 8 | 10 | .2416 | 11 | .2049 | 7.500 | .0 |
| 9 | 9.6 | .2184 | 10.56 | .1833 | 7.500 | .0 |
| 10 | 10.4 | .1957 | 11.44 | ..1623 | 7.500 | .0 |
| 11 | 9.4 | .1773 | 10.34 | .1455 | 7.367 | .0 |
| 12 | 9.3 | .1608 | 10.23 | .1307 | 7.233 | .0 |
| 13 | 9.1 | .1462 | 10.01 | .1176 | 7.100 | .0 |
| 14 | 8.9 | .1332 | 9.79 | .1061 | 6.967 | .0 |
| 15 | 8.7 | .1216 | 9.57 | .0959 | 6.833 | .0 |
| 16 | 8.4 | .1114 | 9.24 | .0871 | 6.700 | .0 |
| 17 | 8.4 | .102 | 9.24 | .079 | 6.567 | .0 |
| 18 | 8.2 | .0936 | 9.02 | .0719 | 6.433 | .0 |
| 19 | 8.1 | .0861 | 8.91 | .0655 | 6.300 | .0 |
| 20 | 7.6 | .0795 | 8.36 | .06 | 6.167 | .0 |
| 21 | 7.2 | .0738 | 7.92 | .0553 | 6.033 | .0 |
| 22 | 7.1 | .0686 | 7.81 | .0509 | 5.900 | .0 |
| 23 | 6.9 | .0638 | 7.59 | .0471 | 5.767 | .0 |
| 24 | 6.7 | .0595 | 7.37 | .0436 | 5.633 | .0 |
| 25 | 6.4 | .0557 | 7.04 | .0405 | 5.500 | .0 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:OTHER. 110% LAPSE

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 81.19 | 78.56 | 76.42 | 79.97 | 81.19 | 79.6 | 79.6 | 81.19 | 81.19 | 80.35 | 79.97 | 79.97 | 79.97 | 79.97 |
| 2 | 70.71 | 67.3 | 64.98 | 68.98 | 70.71 | 67.41 | 67.88 | 69.1 | 70.22 | 69.51 | 68.98 | 69.32 | 68.6 | 68.74 |
| 3 | 62.6 | 58.79 | 56.53 | 60.53 | 62.6 | 57.66 | 58.91 | 60.31 | 61.74 | 61.14 | 60.53 | 61.19 | 59.86 | 60.09 |
| 4 | 55.87 | 51.85 | 49.73 | 53.55 | 54.07 | 50.51 | 51.63 | 53.26 | 54.72 | 54.22 | 53.55 | 54.47 | 52.69 | 52.96 |
| 5 | 50.08 | 45.97 | 43.99 | 47.58 | 46.84 | 44.6 | 45.51 | 47.33 | 48.71 | 48.27 | 47.58 | 48.72 | 46.59 | 46.88 |
| 6 | 45 | 40.87 | 39.04 | 42.38 | 40.63 | 39.54 | 40.28 | 42.22 | 43.47 | 43.07 | 42.38 | 43.69 | 41.32 | 41.61 |
| 7 | 40.5 | 36.43 | 34.74 | 37.8 | 36.1 | 35.15 | 35.75 | 37.76 | 38.85 | 38.49 | 37.8 | 39.24 | 36.72 | 37.01 |
| 8 | 36.47 | 32.49 | 30.94 | 33.74 | 32.08 | 31.29 | 31.77 | 33.82 | 34.74 | 34.41 | 33.74 | 35.28 | 32.66 | 32.94 |
| 9 | 32.85 | 29 | 27.57 | 30.12 | 28.51 | 27.87 | 28.27 | 30.31 | 31.07 | 30.76 | 30.12 | 31.72 | 29.07 | 29.32 |
| 10 | 29.57 | 25.87 | 24.53 | 26.83 | 25.38 | 24.81 | 25.14 | 27.15 | 27.76 | 27.45 | 26.83 | 28.5 | 25.85 | 26.09 |
| 11 | 26.6 | 23.09 | 21.84 | 23.92 | 22.58 | 22.08 | 22.36 | 24.33 | 24.8 | 24.5 | 23.92 | 25.6 | 22.99 | 23.21 |
| 12 | 23.88 | 20.56 | 19.4 | 21.27 | 20.04 | 19.6 | 19.84 | 21.75 | 22.1 | 21.81 | 21.27 | 22.93 | 20.4 | 20.59 |
| 13 | 21.36 | 18.25 | 17.18 | 18.85 | 17.73 | 17.35 | 17.56 | 19.39 | 19.63 | 19.34 | 18.85 | 20.48 | 18.04 | 18.21 |
| 14 | 19.02 | 16.13 | 15.15 | 16.63 | 15.62 | 15.3 | 15.47 | 17.21 | 17.37 | 17.08 | 16.63 | 18.21 | 15.88 | 16.04 |
| 15 | 16.84 | 14.19 | 13.28 | 14.59 | 13.68 | 13.41 | 13.56 | 15.18 | 15.28 | 15 | 14.59 | 16.09 | 13.9 | 14.04 |
| 16 | 14.79 | 12.38 | 11.56 | 12.7 | 11.9 | 11.67 | 11.79 | 13.3 | 13.33 | 13.07 | 12.7 | 14.11 | 12.08 | 12.19 |
| 17 | 12.86 | 10.7 | 9.96 | 10.94 | 10.24 | 10.05 | 10.15 | 11.53 | 11.52 | 11.26 | 10.94 | 12.25 | 10.38 | 10.48 |
| 18 | 11.03 | 9.12 | 8.46 | 9.3 | 8.7 | 8.54 | 8.63 | 9.86 | 9.82 | 9.58 | 9.3 | 10.48 | 8.8 | 8.89 |
| 19 | 9.28 | 7.64 | 7.06 | 7.77 | 7.26 | 7.13 | 7.2 | 8.29 | 8.23 | 8 | 7.77 | 8.81 | 7.32 | 7.39 |
| 20 | 7.62 | 6.24 | 5.75 | 6.32 | 5.9 | 5.8 | 5.85 | 6.79 | 6.72 | 6.52 | 6.32 | 7.22 | 5.94 | 6 |
| 21 | 6.02 | 4.91 | 4.5 | 4.95 | 4.62 | 4.54 | 4.58 | 5.35 | 5.28 | 5.11 | 4.95 | 5.69 | 4.63 | 4.68 |
| 22 | 4.46 | 3.62 | 3.31 | 3.64 | 3.39 | 3.34 | 3.37 | 3.95 | 3.89 | 3.76 | 3.64 | 4.21 | 3.38 | 3.42 |
| 23 | 2.94 | 2.38 | 2.17 | 2.39 | 2.22 | 2.19 | 2.2 | 2.6 | 2.56 | 2.46 | 2.39 | 2.77 | 2.2 | 2.22 |
| 24 | 1.46 | 1.17 | 1.07 | 1.17 | 1.09 | 1.07 | 1.08 | 1.29 | 1.26 | 1.21 | 1.17 | 1.37 | 1.07 | 1.08 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 103.34 | 100 | 97.28 | 101.79 | 103.34 | 101.32 | 101.32 | 103.34 | 103.34 | 102.28 | 101.79 | 101.79 | 101.79 | 101.79 |
| 2 | 105.07 | 100 | 96.56 | 102.5 | 105.07 | 100.17 | 100.86 | 102.68 | 104.34 | 103.29 | 102.5 | 103.01 | 101.94 | 102.15 |
| 3 | 106.48 | 100 | 96.16 | 102.96 | 106.48 | 98.08 | 100.2 | 102.59 | 105.02 | 104 | 102.96 | 104.08 | 101.82 | 102.2 |
| 4 | 107.75 | 100 | 95.91 | 103.29 | 104.27 | 97.42 | 99.57 | 102.71 | 105.54 | 104.56 | 103.29 | 105.06 | 101.61 | 102.13 |
| 5 | 108.94 | 100 | 95.71 | 103.52 | 101.91 | 97.02 | 99.01 | 102.97 | 105.98 | 105.02 | 103.52 | 105.99 | 101.36 | 101.99 |
| 6 | 110.08 | 100 | 95.52 | 103.67 | 99.41 | 96.74 | 98.54 | 103.29 | 106.34 | 105.38 | 103.67 | 106.88 | 101.09 | 101.81 |
| 7 | 111.18 | 100 | 95.37 | 103.78 | 99.09 | 96.5 | 98.14 | 103.67 | 106.65 | 105.67 | 103.78 | 107.74 | 100.81 | 101.6 |
| 8 | 112.24 | 100 | 95.21 | 103.83 | 98.72 | 96.3 | 97.79 | 104.07 | 106.9 | 105.89 | 103.83 | 108.57 | 100.52 | 101.36 |
| 9 | 113.28 | 100 | 95.07 | 103.84 | 98.29 | 96.11 | 97.48 | 104.51 | 107.12 | 106.07 | 103.84 | 109.38 | 100.24 | 101.11 |
| 10 | 114.29 | 100 | 94.8 | 103.72 | 98.09 | 95.89 | 97.17 | 104.96 | 107.29 | 106.1 | 103.72 | 110.15 | 99.93 | 100.83 |
| 11 | 115.24 | 100 | 94.6 | 103.61 | 97.81 | 95.64 | 96.85 | 105.39 | 107.43 | 106.12 | 103.61 | 110.88 | 99.59 | 100.52 |
| 12 | 116.16 | 100 | 94.38 | 103.46 | 97.48 | 95.36 | 96.54 | 105.82 | 107.53 | 106.09 | 103.46 | 111.57 | 99.23 | 100.17 |
| 13 | 117.03 | 100 | 94.14 | 103.28 | 97.18 | 95.1 | 96.23 | 106.23 | 107.6 | 106 | 103.28 | 112.23 | 98.85 | 99.8 |
| 14 | 117.87 | 100 | 93.89 | 103.06 | 96.82 | 94.82 | 95.91 | 106.64 | 107.65 | 105.88 | 103.06 | 112.84 | 98.44 | 99.4 |
| 15 | 118.67 | 100 | 93.62 | 102.82 | 96.42 | 94.53 | 95.58 | 107.03 | 107.67 | 105.71 | 102.82 | 113.42 | 98 | 98.96 |
| 16 | 119.44 | 100 | 93.36 | 102.57 | 96.1 | 94.24 | 95.25 | 107.41 | 107.68 | 105.52 | 102.57 | 113.97 | 97.52 | 98.48 |
| 17 | 120.17 | 100 | 93.07 | 102.29 | 95.74 | 93.93 | 94.91 | 107.77 | 107.68 | 105.28 | 102.29 | 114.47 | 97 | 97.97 |
| 18 | 120.85 | 100 | 92.77 | 101.98 | 95.34 | 93.61 | 94.56 | 108.11 | 107.67 | 105.01 | 101.98 | 114.92 | 96.43 | 97.4 |
| 19 | 121.5 | 100 | 92.44 | 101.64 | 94.99 | 93.27 | 94.19 | 108.43 | 107.65 | 104.7 | 101.64 | 115.32 | 95.8 | 96.78 |
| 20 | 122.1 | 100 | 92.13 | 101.31 | 94.59 | 92.92 | 93.81 | 108.72 | 107.63 | 104.39 | 101.31 | 115.67 | 95.1 | 96.08 |
| 21 | 122.66 | 100 | 91.84 | 101 | 94.15 | 92.57 | 93.44 | 108.99 | 107.61 | 104.09 | 101 | 115.98 | 94.33 | 95.32 |
| 22 | 123.2 | 100 | 91.53 | 100.67 | 93.79 | 92.24 | 93.08 | 109.24 | 107.59 | 103.76 | 100.67 | 116.21 | 93.45 | 94.47 |
| 23 | 123.7 | 100 | 91.23 | 100.34 | 93.39 | 91.92 | 92.71 | 109.48 | 107.57 | 103.43 | 100.34 | 116.36 | 92.41 | 93.48 |
| 24 | 124.18 | 100 | 90.92 | 100 | 92.97 | 91.59 | 92.35 | 109.7 | 107.55 | 103.09 | 100 | 116.36 | 91.06 | 92.28 |
| 25 | 90 | 100 | 65.45 | 100 | 66.89 | 65.9 | 66.44 | 79.38 | 91.84 | 90 | 90 | 84.34 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:OTHER. 110% LAPSE

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 18.81 | 21.44 | 23.58 | 20.03 | 18.81 | 20.4 | 20.4 | 18.81 | 18.81 | 19.65 | 20.03 | 20.03 | 20.03 | 20.03 |
| 2 | 10.49 | 11.27 | 11.44 | 10.99 | 10.49 | 12.19 | 11.73 | 12.09 | 10.98 | 10.85 | 10.99 | 10.65 | 11.37 | 11.23 |
| 3 | 8.11 | 8.51 | 8.45 | 8.45 | 8.11 | 9.75 | 8.97 | 8.79 | 8.48 | 8.37 | 8.45 | 8.14 | 8.74 | 8.65 |
| 4 | 6.73 | 6.94 | 6.8 | 6.97 | 8.53 | 7.15 | 7.28 | 7.05 | 7.01 | 6.92 | 6.97 | 6.71 | 7.17 | 7.13 |
| 5 | 5.79 | 5.89 | 5.74 | 5.97 | 7.23 | 5.92 | 6.11 | 5.93 | 6.01 | 5.95 | 5.97 | 5.76 | 6.1 | 6.08 |
| 6 | 5.08 | 5.09 | 4.95 | 5.21 | 6.21 | 5.05 | 5.23 | 5.11 | 5.25 | 5.2 | 5.21 | 5.03 | 5.27 | 5.27 |
| 7 | 4.5 | 4.45 | 4.31 | 4.57 | 4.54 | 4.39 | 4.53 | 4.46 | 4.62 | 4.58 | 4.57 | 4.44 | 4.6 | 4.61 |
| 8 | 4.03 | 3.93 | 3.8 | 4.06 | 4.02 | 3.86 | 3.97 | 3.94 | 4.11 | 4.08 | 4.06 | 3.96 | 4.06 | 4.07 |
| 9 | 3.62 | 3.49 | 3.37 | 3.62 | 3.57 | 3.42 | 3.5 | 3.51 | 3.67 | 3.65 | 3.62 | 3.56 | 3.59 | 3.61 |
| 10 | 3.28 | 3.13 | 3.04 | 3.28 | 3.13 | 3.06 | 3.13 | 3.15 | 3.31 | 3.31 | 3.28 | 3.22 | 3.22 | 3.24 |
| 11 | 2.96 | 2.79 | 2.69 | 2.91 | 2.8 | 2.73 | 2.78 | 2.82 | 2.96 | 2.95 | 2.91 | 2.9 | 2.86 | 2.88 |
| 12 | 2.73 | 2.53 | 2.44 | 2.65 | 2.54 | 2.48 | 2.52 | 2.58 | 2.7 | 2.69 | 2.65 | 2.66 | 2.59 | 2.61 |
| 13 | 2.52 | 2.31 | 2.22 | 2.42 | 2.31 | 2.25 | 2.28 | 2.37 | 2.47 | 2.46 | 2.42 | 2.45 | 2.36 | 2.38 |
| 14 | 2.34 | 2.11 | 2.03 | 2.22 | 2.11 | 2.06 | 2.09 | 2.18 | 2.27 | 2.26 | 2.22 | 2.27 | 2.16 | 2.18 |
| 15 | 2.18 | 1.95 | 1.87 | 2.04 | 1.94 | 1.89 | 1.91 | 2.02 | 2.09 | 2.09 | 2.04 | 2.12 | 1.98 | 2 |
| 16 | 2.05 | 1.8 | 1.72 | 1.89 | 1.78 | 1.74 | 1.77 | 1.88 | 1.94 | 1.93 | 1.89 | 1.98 | 1.83 | 1.84 |
| 17 | 1.93 | 1.68 | 1.6 | 1.76 | 1.66 | 1.62 | 1.64 | 1.77 | 1.81 | 1.8 | 1.76 | 1.87 | 1.7 | 1.71 |
| 18 | 1.83 | 1.58 | 1.49 | 1.64 | 1.54 | 1.51 | 1.53 | 1.67 | 1.7 | 1.68 | 1.64 | 1.76 | 1.58 | 1.59 |
| 19 | 1.74 | 1.48 | 1.4 | 1.54 | 1.44 | 1.41 | 1.43 | 1.58 | 1.6 | 1.58 | 1.54 | 1.67 | 1.48 | 1.49 |
| 20 | 1.66 | 1.4 | 1.31 | 1.44 | 1.35 | 1.33 | 1.34 | 1.5 | 1.51 | 1.48 | 1.44 | 1.59 | 1.38 | 1.4 |
| 21 | 1.6 | 1.34 | 1.25 | 1.37 | 1.29 | 1.26 | 1.27 | 1.44 | 1.44 | 1.41 | 1.37 | 1.53 | 1.31 | 1.32 |
| 22 | 1.56 | 1.29 | 1.19 | 1.31 | 1.22 | 1.2 | 1.21 | 1.39 | 1.38 | 1.35 | 1.31 | 1.48 | 1.24 | 1.26 |
| 23 | 1.52 | 1.24 | 1.14 | 1.26 | 1.17 | 1.15 | 1.16 | 1.35 | 1.34 | 1.3 | 1.26 | 1.44 | 1.18 | 1.2 |
| 24 | 1.48 | 1.2 | 1.1 | 1.21 | 1.13 | 1.11 | 1.12 | 1.32 | 1.3 | 1.25 | 1.21 | 1.4 | 1.13 | 1.14 |
| 25 | 1.46 | 1.17 | 1.07 | 1.17 | 1.09 | 1.07 | 1.08 | 1.29 | 1.26 | 1.21 | 1.17 | 1.37 | 1.07 | 1.08 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 87.74 | 100 | 109.99 | 93.44 | 87.74 | 95.16 | 95.16 | 87.74 | 87.74 | 91.65 | 93.44 | 93.44 | 93.44 | 93.44 |
| 2 | 93.06 | 100 | 101.54 | 97.54 | 93.06 | 108.17 | 104.08 | 107.31 | 97.41 | 96.27 | 97.54 | 94.49 | 100.91 | 99.67 |
| 3 | 95.28 | 100 | 99.32 | 99.35 | 95.28 | 114.62 | 105.42 | 103.33 | 99.66 | 98.35 | 99.35 | 95.67 | 102.73 | 101.74 |
| 4 | 96.99 | 100 | 98.07 | 100.5 | 123 | 103.08 | 104.94 | 101.64 | 101.08 | 99.79 | 100.5 | 96.75 | 103.4 | 102.74 |
| 5 | 98.45 | 100 | 97.46 | 101.45 | 122.75 | 100.5 | 103.88 | 100.75 | 102.15 | 101.02 | 101.45 | 97.8 | 103.57 | 103.23 |
| 6 | 99.8 | 100 | 97.18 | 102.29 | 121.91 | 99.29 | 102.81 | 100.34 | 103.05 | 102.13 | 102.29 | 98.84 | 103.53 | 103.47 |
| 7 | 101.12 | 100 | 96.82 | 102.83 | 102.04 | 98.65 | 101.85 | 100.24 | 103.84 | 102.99 | 102.83 | 99.84 | 103.38 | 103.55 |
| 8 | 102.39 | 100 | 96.67 | 103.38 | 102.19 | 98.23 | 101.03 | 100.29 | 104.52 | 103.82 | 103.38 | 100.86 | 103.17 | 103.53 |
| 9 | 103.65 | 100 | 96.4 | 103.67 | 102.24 | 97.86 | 100.33 | 100.49 | 105.13 | 104.43 | 103.67 | 101.84 | 102.92 | 103.43 |
| 10 | 104.9 | 100 | 97.24 | 104.91 | 100 | 97.91 | 100.05 | 100.76 | 105.66 | 105.83 | 104.91 | 103.03 | 102.8 | 103.44 |
| 11 | 106.4 | 100 | 96.48 | 104.58 | 100.39 | 97.98 | 99.8 | 101.4 | 106.2 | 105.89 | 104.58 | 104.11 | 102.72 | 103.45 |
| 12 | 107.8 | 100 | 96.43 | 104.84 | 100.45 | 97.87 | 99.39 | 101.92 | 106.61 | 106.41 | 104.84 | 105.25 | 102.49 | 103.3 |
| 13 | 109.21 | 100 | 96.26 | 104.92 | 99.91 | 97.42 | 99.03 | 102.51 | 106.96 | 106.75 | 104.92 | 106.38 | 102.25 | 103.12 |
| 14 | 110.63 | 100 | 96.05 | 104.9 | 99.88 | 97.21 | 98.67 | 103.14 | 107.24 | 106.98 | 104.9 | 107.51 | 101.98 | 102.89 |
| 15 | 112.04 | 100 | 95.8 | 104.8 | 99.74 | 96.93 | 98.28 | 103.79 | 107.45 | 107.09 | 104.8 | 108.62 | 101.66 | 102.6 |
| 16 | 113.44 | 100 | 95.42 | 104.54 | 98.61 | 96.56 | 97.85 | 104.46 | 107.6 | 107.01 | 104.54 | 109.7 | 101.27 | 102.22 |
| 17 | 114.81 | 100 | 95.21 | 104.41 | 98.38 | 96.18 | 97.4 | 105.11 | 107.71 | 107.05 | 104.41 | 110.79 | 100.81 | 101.76 |
| 18 | 116.18 | 100 | 94.82 | 104.07 | 98.07 | 95.79 | 96.95 | 105.79 | 107.76 | 106.85 | 104.07 | 111.83 | 100.29 | 101.25 |
| 19 | 117.52 | 100 | 94.44 | 103.72 | 97.16 | 95.38 | 96.45 | 106.46 | 107.76 | 106.61 | 103.72 | 112.85 | 99.68 | 100.63 |
| 20 | 118.83 | 100 | 93.81 | 103.09 | 96.77 | 94.84 | 95.86 | 107.13 | 107.73 | 106.06 | 103.09 | 113.76 | 98.92 | 99.86 |
| 21 | 120.04 | 100 | 93.21 | 102.47 | 96.19 | 94.18 | 95.18 | 107.73 | 107.7 | 105.5 | 102.47 | 114.57 | 97.96 | 98.88 |
| 22 | 121.16 | 100 | 92.7 | 101.93 | 95.18 | 93.5 | 94.47 | 108.27 | 107.67 | 105 | 101.93 | 115.31 | 96.8 | 97.73 |
| 23 | 122.23 | 100 | 92.12 | 101.31 | 94.54 | 92.87 | 93.77 | 108.78 | 107.63 | 104.41 | 101.31 | 115.93 | 95.44 | 96.36 |
| 24 | 123.24 | 100 | 91.53 | 100.66 | 93.81 | 92.24 | 93.07 | 109.26 | 107.59 | 103.76 | 100.66 | 116.36 | 93.71 | 94.65 |
| 25 | 124.18 | 100 | 90.92 | 100 | 92.97 | 91.59 | 92.35 | 109.7 | 107.55 | 103.09 | 100 | 116.36 | 91.06 | 92.28 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:COMMS. 110% LAPSE

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 70.88 | 68.07 | 66.72 | 69.82 | 70.88 | 69.5 | 69.5 | 70.88 | 70.88 | 70.15 | 69.82 | 69.66 | 69.66 | 69.82 |
| 2 | 77.76 | 72.97 | 71.46 | 75.17 | 77.76 | 74.14 | 74.64 | 75.99 | 76.92 | 76.44 | 75.86 | 76.14 | 75.54 | 75.6 |
| 3 | 74.89 | 69.13 | 67.63 | 71.46 | 74.89 | 68.98 | 70.47 | 72.15 | 73.29 | 73.14 | 72.41 | 73.12 | 71.77 | 71.88 |
| 4 | 72.24 | 65.75 | 64.3 | 68.07 | 69.91 | 65.31 | 66.75 | 68.86 | 69.95 | 70.1 | 69.25 | 70.38 | 68.32 | 68.47 |
| 5 | 69.7 | 62.64 | 61.23 | 64.84 | 65.19 | 62.07 | 63.34 | 65.87 | 66.77 | 67.19 | 66.23 | 67.76 | 65.06 | 65.25 |
| 6 | 62.63 | 55.7 | 54.34 | 57.75 | 56.56 | 55.03 | 56.06 | 58.76 | 59.45 | 59.95 | 58.98 | 60.76 | 57.67 | 57.92 |
| 7 | 56.36 | 49.64 | 48.35 | 51.51 | 50.24 | 48.93 | 49.75 | 52.56 | 53.02 | 53.57 | 52.61 | 54.58 | 51.22 | 51.51 |
| 8 | 50.76 | 44.28 | 43.06 | 45.98 | 44.65 | 43.55 | 44.22 | 47.07 | 47.31 | 47.89 | 46.96 | 49.07 | 45.55 | 45.84 |
| 9 | 45.72 | 39.52 | 38.37 | 41.04 | 39.68 | 38.79 | 39.35 | 42.18 | 42.22 | 42.81 | 41.92 | 44.12 | 40.52 | 40.81 |
| 10 | 41.15 | 35.26 | 34.14 | 36.57 | 35.32 | 34.53 | 34.99 | 37.8 | 37.65 | 38.2 | 37.35 | 39.64 | 36.03 | 36.31 |
| 11 | 37.03 | 31.46 | 30.4 | 32.6 | 31.43 | 30.73 | 31.12 | 33.86 | 33.58 | 34.1 | 33.29 | 35.6 | 32.03 | 32.3 |
| 12 | 33.23 | 28.01 | 27 | 28.98 | 27.89 | 27.28 | 27.62 | 30.27 | 29.87 | 30.35 | 29.6 | 31.9 | 28.41 | 28.66 |
| 13 | 29.73 | 24.87 | 23.91 | 25.68 | 24.68 | 24.15 | 24.44 | 26.98 | 26.48 | 26.92 | 26.23 | 28.48 | 25.12 | 25.35 |
| 14 | 26.47 | 21.99 | 21.08 | 22.66 | 21.74 | 21.29 | 21.54 | 23.95 | 23.38 | 23.78 | 23.14 | 25.32 | 22.12 | 22.32 |
| 15 | 23.43 | 19.33 | 18.49 | 19.88 | 19.04 | 18.67 | 18.87 | 21.13 | 20.53 | 20.87 | 20.3 | 22.38 | 19.36 | 19.54 |
| 16 | 20.58 | 16.87 | 16.09 | 17.31 | 16.56 | 16.24 | 16.42 | 18.51 | 17.89 | 18.19 | 17.68 | 19.63 | 16.81 | 16.97 |
| 17 | 17.89 | 14.58 | 13.86 | 14.91 | 14.26 | 13.99 | 14.13 | 16.05 | 15.43 | 15.68 | 15.23 | 17.03 | 14.45 | 14.59 |
| 18 | 15.35 | 12.43 | 11.78 | 12.68 | 12.11 | 11.89 | 12.01 | 13.73 | 13.14 | 13.33 | 12.95 | 14.58 | 12.25 | 12.37 |
| 19 | 12.92 | 10.41 | 9.83 | 10.58 | 10.1 | 9.92 | 10.02 | 11.53 | 10.98 | 11.13 | 10.81 | 12.26 | 10.19 | 10.29 |
| 20 | 10.61 | 8.5 | 8 | 8.62 | 8.22 | 8.07 | 8.15 | 9.44 | 8.96 | 9.07 | 8.8 | 10.04 | 8.26 | 8.35 |
| 21 | 8.37 | 6.68 | 6.27 | 6.75 | 6.43 | 6.32 | 6.38 | 7.44 | 7.03 | 7.11 | 6.9 | 7.91 | 6.44 | 6.51 |
| 22 | 6.21 | 4.93 | 4.61 | 4.97 | 4.72 | 4.65 | 4.69 | 5.5 | 5.18 | 5.23 | 5.07 | 5.85 | 4.71 | 4.76 |
| 23 | 4.09 | 3.24 | 3.02 | 3.25 | 3.09 | 3.04 | 3.07 | 3.62 | 3.4 | 3.42 | 3.32 | 3.85 | 3.06 | 3.09 |
| 24 | 2.03 | 1.6 | 1.49 | 1.6 | 1.52 | 1.5 | 1.51 | 1.79 | 1.68 | 1.68 | 1.63 | 1.9 | 1.49 | 1.51 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 104.14 | 100 | 98.02 | 102.57 | 104.14 | 102.1 | 102.1 | 104.14 | 104.14 | 103.06 | 102.57 | 102.34 | 102.34 | 102.57 |
| 2 | 106.56 | 100 | 97.93 | 103.01 | 106.56 | 101.6 | 102.3 | 104.14 | 105.42 | 104.75 | 103.96 | 104.35 | 103.52 | 103.6 |
| 3 | 108.33 | 100 | 97.83 | 103.38 | 108.33 | 99.79 | 101.94 | 104.37 | 106.02 | 105.81 | 104.75 | 105.78 | 103.83 | 103.98 |
| 4 | 109.88 | 100 | 97.8 | 103.53 | 106.33 | 99.34 | 101.53 | 104.74 | 106.39 | 106.63 | 105.33 | 107.04 | 103.92 | 104.15 |
| 5 | 111.27 | 100 | 97.75 | 103.52 | 104.08 | 99.09 | 101.13 | 105.16 | 106.6 | 107.26 | 105.73 | 108.18 | 103.87 | 104.17 |
| 6 | 112.43 | 100 | 97.56 | 103.67 | 101.54 | 98.8 | 100.64 | 105.5 | 106.73 | 107.63 | 105.89 | 109.09 | 103.53 | 103.98 |
| 7 | 113.55 | 100 | 97.4 | 103.78 | 101.21 | 98.56 | 100.23 | 105.88 | 106.81 | 107.92 | 105.99 | 109.96 | 103.19 | 103.77 |
| 8 | 114.64 | 100 | 97.24 | 103.83 | 100.83 | 98.35 | 99.87 | 106.3 | 106.84 | 108.15 | 106.04 | 110.81 | 102.86 | 103.53 |
| 9 | 115.69 | 100 | 97.1 | 103.84 | 100.39 | 98.16 | 99.56 | 106.74 | 106.84 | 108.33 | 106.06 | 111.64 | 102.53 | 103.27 |
| 10 | 116.73 | 100 | 96.83 | 103.72 | 100.18 | 97.94 | 99.24 | 107.2 | 106.8 | 108.36 | 105.93 | 112.42 | 102.18 | 102.99 |
| 11 | 117.7 | 100 | 96.62 | 103.61 | 99.9 | 97.68 | 98.92 | 107.64 | 106.72 | 108.39 | 105.82 | 113.17 | 101.81 | 102.66 |
| 12 | 118.64 | 100 | 96.39 | 103.46 | 99.57 | 97.4 | 98.6 | 108.07 | 106.62 | 108.35 | 105.67 | 113.87 | 101.43 | 102.31 |
| 13 | 119.53 | 100 | 96.15 | 103.28 | 99.25 | 97.13 | 98.28 | 108.5 | 106.49 | 108.27 | 105.48 | 114.54 | 101.02 | 101.93 |
| 14 | 120.39 | 100 | 95.89 | 103.06 | 98.89 | 96.85 | 97.95 | 108.92 | 106.35 | 108.14 | 105.26 | 115.17 | 100.59 | 101.52 |
| 15 | 121.21 | 100 | 95.62 | 102.82 | 98.48 | 96.55 | 97.62 | 109.32 | 106.19 | 107.97 | 105.02 | 115.77 | 100.13 | 101.07 |
| 16 | 121.99 | 100 | 95.35 | 102.57 | 98.15 | 96.25 | 97.28 | 109.7 | 106.01 | 107.77 | 104.76 | 116.32 | 99.63 | 100.59 |
| 17 | 122.73 | 100 | 95.06 | 102.29 | 97.79 | 95.94 | 96.94 | 110.07 | 105.83 | 107.53 | 104.47 | 116.83 | 99.1 | 100.06 |
| 18 | 123.43 | 100 | 94.75 | 101.98 | 97.38 | 95.61 | 96.58 | 110.42 | 105.65 | 107.25 | 104.15 | 117.29 | 98.51 | 99.48 |
| 19 | 124.1 | 100 | 94.41 | 101.64 | 97.02 | 95.26 | 96.2 | 110.74 | 105.48 | 106.93 | 103.81 | 117.71 | 97.86 | 98.84 |
| 20 | 124.71 | 100 | 94.1 | 101.31 | 96.61 | 94.9 | 95.82 | 111.04 | 105.31 | 106.62 | 103.48 | 118.06 | 97.14 | 98.14 |
| 21 | 125.28 | 100 | 93.8 | 101 | 96.16 | 94.55 | 95.44 | 111.31 | 105.16 | 106.31 | 103.16 | 118.37 | 96.35 | 97.36 |
| 22 | 125.83 | 100 | 93.49 | 100.67 | 95.79 | 94.21 | 95.06 | 111.57 | 105.01 | 105.98 | 102.82 | 118.61 | 95.45 | 96.49 |
| 23 | 126.34 | 100 | 93.17 | 100.34 | 95.39 | 93.88 | 94.69 | 111.82 | 104.87 | 105.64 | 102.48 | 118.76 | 94.38 | 95.48 |
| 24 | 126.83 | 100 | 92.86 | 100 | 94.96 | 93.54 | 94.32 | 112.05 | 104.75 | 105.29 | 102.14 | 118.76 | 93.01 | 94.25 |
| 25 | 89.66 | 100 | 65.19 | 100 | 66.63 | 65.65 | 66.18 | 79.07 | 91.22 | 89.66 | 89.66 | 83.95 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:COMMS. 110% LAPSE

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 29.12 | 31.93 | 33.28 | 30.18 | 29.12 | 30.5 | 30.5 | 29.12 | 29.12 | 29.85 | 30.18 | 30.34 | 30.34 | 30.18 |
| 2 | -6.87 | -4.9 | -4.74 | -5.35 | -6.87 | -4.64 | -5.15 | -5.11 | -6.04 | -6.29 | -6.04 | -6.48 | -5.88 | -5.78 |
| 3 | 2.87 | 3.84 | 3.83 | 3.7 | 2.87 | 5.15 | 4.17 | 3.84 | 3.63 | 3.3 | 3.45 | 3.02 | 3.77 | 3.72 |
| 4 | 2.65 | 3.38 | 3.33 | 3.39 | 4.98 | 3.67 | 3.72 | 3.28 | 3.34 | 3.04 | 3.16 | 2.74 | 3.45 | 3.41 |
| 5 | 2.54 | 3.11 | 3.07 | 3.22 | 4.71 | 3.24 | 3.41 | 2.99 | 3.17 | 2.92 | 3.02 | 2.62 | 3.26 | 3.22 |
| 6 | 7.07 | 6.94 | 6.89 | 7.1 | 8.64 | 7.04 | 7.29 | 7.11 | 7.32 | 7.24 | 7.25 | 7 | 7.4 | 7.33 |
| 7 | 6.26 | 6.06 | 6 | 6.23 | 6.32 | 6.11 | 6.31 | 6.21 | 6.43 | 6.38 | 6.37 | 6.18 | 6.44 | 6.41 |
| 8 | 5.6 | 5.36 | 5.29 | 5.54 | 5.59 | 5.37 | 5.53 | 5.49 | 5.71 | 5.68 | 5.66 | 5.51 | 5.68 | 5.66 |
| 9 | 5.04 | 4.76 | 4.69 | 4.93 | 4.97 | 4.76 | 4.88 | 4.89 | 5.09 | 5.08 | 5.04 | 4.95 | 5.03 | 5.03 |
| 10 | 4.57 | 4.26 | 4.23 | 4.47 | 4.36 | 4.26 | 4.36 | 4.39 | 4.57 | 4.61 | 4.57 | 4.48 | 4.49 | 4.5 |
| 11 | 4.13 | 3.8 | 3.74 | 3.97 | 3.89 | 3.8 | 3.87 | 3.93 | 4.08 | 4.11 | 4.05 | 4.03 | 3.99 | 4.01 |
| 12 | 3.8 | 3.45 | 3.4 | 3.62 | 3.54 | 3.45 | 3.5 | 3.59 | 3.71 | 3.75 | 3.69 | 3.71 | 3.62 | 3.64 |
| 13 | 3.51 | 3.14 | 3.09 | 3.3 | 3.21 | 3.13 | 3.18 | 3.29 | 3.38 | 3.43 | 3.37 | 3.41 | 3.29 | 3.31 |
| 14 | 3.26 | 2.88 | 2.83 | 3.02 | 2.94 | 2.86 | 2.9 | 3.03 | 3.1 | 3.15 | 3.09 | 3.16 | 3.01 | 3.03 |
| 15 | 3.04 | 2.65 | 2.6 | 2.78 | 2.7 | 2.63 | 2.66 | 2.81 | 2.85 | 2.9 | 2.84 | 2.94 | 2.76 | 2.78 |
| 16 | 2.85 | 2.46 | 2.4 | 2.57 | 2.48 | 2.42 | 2.46 | 2.62 | 2.64 | 2.69 | 2.63 | 2.75 | 2.55 | 2.57 |
| 17 | 2.69 | 2.29 | 2.23 | 2.4 | 2.31 | 2.25 | 2.28 | 2.46 | 2.46 | 2.51 | 2.45 | 2.59 | 2.36 | 2.39 |
| 18 | 2.55 | 2.15 | 2.08 | 2.23 | 2.15 | 2.1 | 2.13 | 2.32 | 2.29 | 2.34 | 2.28 | 2.45 | 2.2 | 2.22 |
| 19 | 2.42 | 2.02 | 1.95 | 2.09 | 2 | 1.97 | 1.99 | 2.2 | 2.15 | 2.2 | 2.14 | 2.33 | 2.06 | 2.08 |
| 20 | 2.32 | 1.91 | 1.83 | 1.97 | 1.89 | 1.85 | 1.87 | 2.09 | 2.03 | 2.07 | 2.01 | 2.22 | 1.93 | 1.95 |
| 21 | 2.23 | 1.82 | 1.73 | 1.87 | 1.79 | 1.75 | 1.77 | 2 | 1.93 | 1.96 | 1.91 | 2.13 | 1.82 | 1.84 |
| 22 | 2.17 | 1.75 | 1.66 | 1.79 | 1.7 | 1.67 | 1.69 | 1.94 | 1.85 | 1.88 | 1.82 | 2.06 | 1.73 | 1.75 |
| 23 | 2.11 | 1.69 | 1.59 | 1.71 | 1.63 | 1.6 | 1.62 | 1.88 | 1.78 | 1.8 | 1.75 | 2 | 1.65 | 1.66 |
| 24 | 2.07 | 1.64 | 1.53 | 1.65 | 1.57 | 1.55 | 1.56 | 1.83 | 1.72 | 1.74 | 1.69 | 1.95 | 1.57 | 1.59 |
| 25 | 2.03 | 1.6 | 1.49 | 1.6 | 1.52 | 1.5 | 1.51 | 1.79 | 1.68 | 1.68 | 1.63 | 1.9 | 1.49 | 1.51 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 91.18 | 100 | 104.22 | 94.52 | 91.18 | 95.53 | 95.53 | 91.18 | 91.18 | 93.47 | 94.52 | 95.01 | 95.01 | 94.52 |
| 2 | 140.23 | 100 | 96.75 | 109.11 | 140.23 | 94.69 | 105.04 | 104.23 | 123.24 | 128.24 | 123.25 | 132.16 | 119.91 | 117.88 |
| 3 | 74.67 | 100 | 99.73 | 96.38 | 74.67 | 134.15 | 108.63 | 100.01 | 94.59 | 85.79 | 89.78 | 78.57 | 98.07 | 96.7 |
| 4 | 78.25 | 100 | 98.48 | 100.38 | 147.28 | 108.55 | 109.91 | 97.14 | 98.92 | 89.86 | 93.5 | 81.18 | 102.04 | 100.72 |
| 5 | 81.89 | 100 | 98.82 | 103.74 | 151.7 | 104.35 | 109.7 | 96.27 | 102.17 | 93.92 | 97.17 | 84.2 | 104.87 | 103.75 |
| 6 | 101.93 | 100 | 99.25 | 102.29 | 124.51 | 101.41 | 105.01 | 102.48 | 105.56 | 104.31 | 104.47 | 100.88 | 106.61 | 105.67 |
| 7 | 103.28 | 100 | 98.88 | 102.83 | 104.22 | 100.76 | 104.03 | 102.38 | 106.07 | 105.19 | 105.03 | 101.9 | 106.3 | 105.76 |
| 8 | 104.58 | 100 | 98.73 | 103.38 | 104.37 | 100.32 | 103.19 | 102.43 | 106.5 | 106.04 | 105.58 | 102.94 | 105.95 | 105.74 |
| 9 | 105.87 | 100 | 98.46 | 103.67 | 104.43 | 99.95 | 102.47 | 102.64 | 106.87 | 106.66 | 105.88 | 103.95 | 105.59 | 105.64 |
| 10 | 107.14 | 100 | 99.32 | 104.91 | 102.14 | 100 | 102.19 | 102.91 | 107.17 | 108.09 | 107.15 | 105.16 | 105.38 | 105.65 |
| 11 | 108.67 | 100 | 98.54 | 104.58 | 102.54 | 100.07 | 101.93 | 103.56 | 107.42 | 108.15 | 106.81 | 106.26 | 105.23 | 105.66 |
| 12 | 110.1 | 100 | 98.49 | 104.84 | 102.6 | 99.96 | 101.51 | 104.1 | 107.57 | 108.68 | 107.07 | 107.42 | 104.93 | 105.5 |
| 13 | 111.54 | 100 | 98.32 | 104.92 | 102.05 | 99.5 | 101.14 | 104.7 | 107.63 | 109.03 | 107.16 | 108.58 | 104.64 | 105.32 |
| 14 | 112.99 | 100 | 98.1 | 104.9 | 102.02 | 99.29 | 100.77 | 105.34 | 107.61 | 109.26 | 107.14 | 109.73 | 104.32 | 105.08 |
| 15 | 114.43 | 100 | 97.85 | 104.8 | 101.87 | 98.99 | 100.38 | 106.01 | 107.52 | 109.38 | 107.04 | 110.87 | 103.96 | 104.79 |
| 16 | 115.86 | 100 | 97.46 | 104.54 | 100.72 | 98.62 | 99.93 | 106.69 | 107.36 | 109.3 | 106.77 | 111.97 | 103.53 | 104.4 |
| 17 | 117.26 | 100 | 97.25 | 104.41 | 100.48 | 98.23 | 99.48 | 107.35 | 107.15 | 109.33 | 106.64 | 113.08 | 103.04 | 103.94 |
| 18 | 118.66 | 100 | 96.85 | 104.07 | 100.16 | 97.83 | 99.02 | 108.05 | 106.88 | 109.13 | 106.29 | 114.14 | 102.5 | 103.41 |
| 19 | 120.02 | 100 | 96.46 | 103.72 | 99.23 | 97.42 | 98.51 | 108.74 | 106.56 | 108.88 | 105.94 | 115.18 | 101.86 | 102.78 |
| 20 | 121.37 | 100 | 95.82 | 103.09 | 98.83 | 96.86 | 97.91 | 109.42 | 106.21 | 108.33 | 105.29 | 116.11 | 101.07 | 101.99 |
| 21 | 122.6 | 100 | 95.2 | 102.47 | 98.25 | 96.19 | 97.21 | 110.03 | 105.88 | 107.76 | 104.66 | 116.94 | 100.07 | 100.99 |
| 22 | 123.75 | 100 | 94.68 | 101.93 | 97.21 | 95.5 | 96.49 | 110.58 | 105.58 | 107.24 | 104.1 | 117.69 | 98.89 | 99.81 |
| 23 | 124.84 | 100 | 94.09 | 101.31 | 96.56 | 94.85 | 95.78 | 111.11 | 105.28 | 106.63 | 103.47 | 118.32 | 97.49 | 98.41 |
| 24 | 125.87 | 100 | 93.48 | 100.66 | 95.81 | 94.21 | 95.05 | 111.6 | 105 | 105.98 | 102.81 | 118.76 | 95.72 | 96.67 |
| 25 | 126.83 | 100 | 92.86 | 100 | 94.96 | 93.54 | 94.32 | 112.05 | 104.75 | 105.29 | 102.14 | 118.76 | 93.01 | 94.25 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
110% LAPSE
(NON-RESERVE STATISTICS HAVE BEEN MULTIPLIED BY 10)

| | | | | | DYNAMIC METHODS ASSET | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOB | STATIC FORMULA | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| OTHER-EPHS-ASSET | -DIFF | 655 | 0 | -283 | 184 | 56 | -170 | -91 | 258 | 367 | 289 | 184 | 448 | 28 | 65 |
| | -ABS(DIFF) | 655 | 0 | 283 | 184 | 203 | 193 | 126 | 258 | 367 | 289 | 184 | 448 | 96 | 107 |
| | -DIFF*2 | 2134 | 0 | 443 | 234 | 419 | 193 | 79 | 346 | 782 | 505 | 234 | 998 | 71 | 95 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 82 | 0 | 46 | 35 | 87 | 48 | 35 | 53 | 59 | 47 | 35 | 56 | 35 | 34 |
| | -DIFF*2 | 87 | 0 | 49 | 22 | 133 | 36 | 17 | 78 | 74 | 37 | 22 | 31 | 23 | 22 |
| COMMS-EPHS-ASSET | -DIFF | 1022 | 0 | -224 | 248 | 190 | -93 | 12 | 481 | 471 | 525 | 385 | 741 | 182 | 221 |
| | -ABS(DIFF) | 1022 | 0 | 224 | 248 | 253 | 145 | 121 | 481 | 471 | 525 | 385 | 741 | 214 | 240 |
| | -DIFF*2 | 5327 | 0 | 251 | 422 | 900 | 107 | 103 | 1178 | 1402 | 1654 | 959 | 2821 | 391 | 471 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 141 | 0 | 30 | 47 | 122 | 43 | 43 | 65 | 84 | 91 | 72 | 102 | 58 | 59 |
| | -DIFF*2 | 162 | 0 | 20 | 36 | 210 | 40 | 27 | 85 | 103 | 79 | 54 | 78 | 43 | 46 |
| OTHER-EPHS-BENEFIT | RES DIF | -24 | 0 | 24 | -23 | 14 | 20 | 18 | -24 | -24 | -24 | -23 | -24 | 6 | 0 |
| | RESERVE INC DIF | 1 | 0 | -9 | 8 | 5 | -5 | 5 | 11 | 7 | 5 | 8 | -1 | 21 | 21 |
| COMMS-EPHS-BENEFIT | RES DIF | -24 | 0 | 24 | -23 | 4 | 20 | 10 | -24 | -24 | -24 | -24 | -24 | -6 | -10 |
| | RESERVE INC DIF | 3 | 0 | -9 | 8 | 17 | 3 | 13 | 5 | 5 | 3 | 3 | 3 | 15 | 15 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

RANK OF STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS

110% LAPSE

| LOB | STATIC | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | EPHS-ASSET | 9 | 5 | 7.9 | 4.2 | 2.1 | 7.1 | 11 | 10 | 5.8 | 12 | 1 | 2.9 |
| | -AMORT | 8.7 | 3 | 12 | 7.1 | 1.4 | 10.8 | 10.1 | 7.9 | 4 | 6.4 | 4.7 | 1.9 |
| COMMS | EPHS-ASSET | 3.1 | 5.1 | 7 | 2 | 1 | 9.1 | 9.9 | 11 | 8 | 12 | 3.9 | 5.9 |
| | -AMORT | 1 | 3.1 | 12 | 3.9 | 2 | 9.7 | 10.8 | 9.1 | 7.1 | 8.3 | 5 | 6 |

APPENDIX 2—*Continued*

INPUT FOR DYNAMIC METHOD COMPARISON TESTS
+5% LAPSE

| YEAR | TOTAL EXP. TERMINATIONS(%) | ENDING EXPECTED L(T) | TOTAL ACT. TERMINATIONS(%) | ENDING ACTUAL L(T) | INTEREST (%) | COMMISSION (%) |
|---|---|---|---|---|---|---|
| 1 | 37 | .63 | 42 | .58 | 7.500 | 55.0 |
| 2 | 19.1 | .5097 | 24.1 | .4402 | 7.500 | 20.0 |
| 3 | 14.8 | .4342 | 19.8 | .3531 | 7.500 | 10.0 |
| 4 | 12.6 | .3795 | 17.6 | .2909 | 7.500 | 9.0 |
| 5 | 11.5 | .3359 | 16.5 | .2429 | 7.500 | 8.0 |
| 6 | 10.9 | .2993 | 15.9 | .2043 | 7.500 | .0 |
| 7 | 10.3 | .2684 | 15.3 | .173 | 7.500 | .0 |
| 8 | 10 | .2416 | 15 | .1471 | 7.500 | .0 |
| 9 | 9.6 | .2184 | 14.6 | .1256 | 7.500 | .0 |
| 10 | 10.4 | .1957 | 15.4 | .1063 | 7.500 | .0 |
| 11 | 9.4 | .1773 | 14.4 | .091 | 7.367 | .0 |
| 12 | 9.3 | .1608 | 14.3 | .078 | 7.233 | .0 |
| 13 | 9.1 | .1462 | 14.1 | .067 | 7.100 | .0 |
| 14 | 8.9 | .1332 | 13.9 | .0577 | 6.967 | .0 |
| 15 | 8.7 | .1216 | 13.7 | .0498 | 6.833 | .0 |
| 16 | 8.4 | .1114 | 13.4 | .0431 | 6.700 | .0 |
| 17 | 8.4 | .102 | 13.4 | .0373 | 6.567 | .0 |
| 18 | 8.2 | .0936 | 13.2 | .0324 | 6.433 | .0 |
| 19 | 8.1 | .0861 | 13.1 | .0281 | 6.300 | .0 |
| 20 | 7.6 | .0795 | 12.6 | .0246 | 6.167 | .0 |
| 21 | 7.2 | .0738 | 12.2 | .0216 | 6.033 | .0 |
| 22 | 7.1 | .0686 | 12.1 | .019 | 5.900 | .0 |
| 23 | 6.9 | .0638 | 11.9 | .0167 | 5.767 | .0 |
| 24 | 6.7 | .0595 | 11.7 | .0148 | 5.633 | .0 |
| 25 | 6.4 | .0557 | 11.4 | .0131 | 5.500 | .0 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:OTHER. +5% LAPSE

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 81.19 | 74.22 | 74.75 | 79.51 | 81.19 | 79.04 | 79.04 | 81.19 | 81.19 | 80.04 | 79.51 | 79.51 | 79.51 | 79.51 |
| 2 | 70.71 | 60.49 | 61.07 | 67.46 | 70.71 | 65.62 | 66.25 | 68.54 | 70.04 | 68.43 | 67.46 | 68.39 | 67.42 | 67.61 |
| 3 | 62.6 | 50.38 | 50.9 | 57.86 | 62.6 | 54.2 | 56.07 | 59.11 | 61.28 | 59.19 | 57.86 | 59.89 | 57.84 | 58.2 |
| 4 | 55.87 | 42.41 | 42.83 | 49.78 | 52.39 | 45.5 | 47.64 | 51.52 | 53.96 | 51.39 | 49.78 | 52.91 | 49.83 | 50.32 |
| 5 | 50.08 | 35.91 | 36.22 | 42.85 | 43.84 | 38.44 | 40.54 | 45.17 | 47.64 | 44.63 | 42.85 | 46.95 | 42.97 | 43.55 |
| 6 | 45 | 30.52 | 30.72 | 36.86 | 36.58 | 32.58 | 34.52 | 39.77 | 42.11 | 38.73 | 36.86 | 41.78 | 37.04 | 37.68 |
| 7 | 40.5 | 26.01 | 26.1 | 31.68 | 31.17 | 27.68 | 29.41 | 35.11 | 37.25 | 33.56 | 31.68 | 37.25 | 31.92 | 32.58 |
| 8 | 36.47 | 22.21 | 22.2 | 27.19 | 26.48 | 23.54 | 25.06 | 31.06 | 32.93 | 29.02 | 27.19 | 33.23 | 27.46 | 28.13 |
| 9 | 32.85 | 18.98 | 18.89 | 23.3 | 22.43 | 20.02 | 21.35 | 27.5 | 29.1 | 25.04 | 23.3 | 29.65 | 23.58 | 24.24 |
| 10 | 29.57 | 16.22 | 16.06 | 19.91 | 19.12 | 17.02 | 18.16 | 24.36 | 25.67 | 21.54 | 19.91 | 26.43 | 20.2 | 20.83 |
| 11 | 26.6 | 13.89 | 13.65 | 17 | 16.25 | 14.47 | 15.44 | 21.6 | 22.63 | 18.49 | 17 | 23.56 | 17.29 | 17.88 |
| 12 | 23.88 | 11.87 | 11.57 | 14.47 | 13.73 | 12.26 | 13.1 | 19.11 | 19.9 | 15.81 | 14.47 | 20.94 | 14.73 | 15.28 |
| 13 | 21.36 | 10.13 | 9.78 | 12.27 | 11.64 | 10.36 | 11.07 | 16.87 | 17.44 | 13.46 | 12.27 | 18.56 | 12.49 | 13 |
| 14 | 19.02 | 8.62 | 8.23 | 10.35 | 9.79 | 8.72 | 9.32 | 14.84 | 15.21 | 11.39 | 10.35 | 16.36 | 10.53 | 10.99 |
| 15 | 16.84 | 7.3 | 6.89 | 8.67 | 8.16 | 7.3 | 7.8 | 12.99 | 13.2 | 9.58 | 8.67 | 14.34 | 8.81 | 9.22 |
| 16 | 14.79 | 6.15 | 5.72 | 7.21 | 6.8 | 6.06 | 6.47 | 11.28 | 11.36 | 7.99 | 7.21 | 12.47 | 7.3 | 7.66 |
| 17 | 12.86 | 5.13 | 4.7 | 5.93 | 5.58 | 4.98 | 5.32 | 9.71 | 9.69 | 6.58 | 5.93 | 10.73 | 5.97 | 6.28 |
| 18 | 11.03 | 4.23 | 3.81 | 4.81 | 4.51 | 4.04 | 4.31 | 8.25 | 8.15 | 5.35 | 4.81 | 9.1 | 4.8 | 5.07 |
| 19 | 9.28 | 3.43 | 3.04 | 3.84 | 3.6 | 3.21 | 3.43 | 6.88 | 6.74 | 4.27 | 3.84 | 7.57 | 3.78 | 4 |
| 20 | 7.62 | 2.72 | 2.36 | 2.98 | 2.8 | 2.5 | 2.66 | 5.6 | 5.43 | 3.32 | 2.98 | 6.13 | 2.88 | 3.06 |
| 21 | 6.02 | 2.07 | 1.76 | 2.23 | 2.08 | 1.86 | 1.99 | 4.39 | 4.22 | 2.48 | 2.23 | 4.77 | 2.1 | 2.24 |
| 22 | 4.46 | 1.49 | 1.23 | 1.56 | 1.46 | 1.31 | 1.39 | 3.23 | 3.08 | 1.74 | 1.56 | 3.48 | 1.42 | 1.53 |
| 23 | 2.94 | .95 | .77 | .97 | .91 | .82 | .87 | 2.11 | 2 | 1.09 | .97 | 2.25 | .84 | .92 |
| 24 | 1.46 | .46 | .36 | .46 | .43 | .38 | .41 | 1.04 | .98 | .51 | .46 | 1.08 | .36 | .4 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 109.39 | 100 | 100.7 | 107.13 | 109.39 | 106.49 | 106.49 | 109.39 | 109.39 | 107.83 | 107.13 | 107.13 | 107.13 | 107.13 |
| 2 | 116.88 | 100 | 100.96 | 111.52 | 116.88 | 108.48 | 109.51 | 113.3 | 115.79 | 113.12 | 111.52 | 113.06 | 111.45 | 111.77 |
| 3 | 124.25 | 100 | 101.02 | 114.84 | 124.25 | 107.58 | 111.29 | 117.32 | 121.64 | 117.49 | 114.84 | 118.88 | 114.8 | 115.52 |
| 4 | 131.74 | 100 | 100.98 | 117.39 | 123.53 | 107.29 | 112.32 | 121.47 | 127.23 | 121.17 | 117.39 | 124.75 | 117.48 | 118.64 |
| 5 | 139.44 | 100 | 100.85 | 119.33 | 122.06 | 107.04 | 112.88 | 125.79 | 132.66 | 124.29 | 119.33 | 130.74 | 119.65 | 121.27 |
| 6 | 147.42 | 100 | 100.63 | 120.77 | 119.86 | 106.75 | 113.1 | 130.29 | 137.98 | 126.89 | 120.77 | 136.89 | 121.36 | 123.46 |
| 7 | 155.68 | 100 | 100.35 | 121.78 | 119.8 | 106.4 | 113.07 | 134.98 | 143.19 | 129.01 | 121.78 | 143.18 | 122.69 | 125.24 |
| 8 | 164.24 | 100 | 99.98 | 122.43 | 119.25 | 105.99 | 112.85 | 139.86 | 148.3 | 130.68 | 122.43 | 149.63 | 123.65 | 126.66 |
| 9 | 173.1 | 100 | 99.55 | 122.76 | 118.16 | 105.5 | 112.48 | 144.92 | 153.32 | 131.95 | 122.76 | 156.22 | 124.27 | 127.73 |
| 10 | 182.28 | 100 | 98.98 | 122.75 | 117.9 | 104.92 | 111.96 | 150.19 | 158.22 | 132.77 | 122.75 | 162.93 | 124.55 | 128.44 |
| 11 | 191.6 | 100 | 98.3 | 122.46 | 117.06 | 104.18 | 111.22 | 155.54 | 163 | 133.18 | 122.46 | 169.66 | 124.5 | 128.77 |
| 12 | 201.14 | 100 | 97.51 | 121.9 | 115.68 | 103.31 | 110.34 | 161.01 | 167.65 | 133.21 | 121.9 | 176.43 | 124.11 | 128.74 |
| 13 | 210.85 | 100 | 96.59 | 121.09 | 114.91 | 102.32 | 109.31 | 166.58 | 172.17 | 132.88 | 121.09 | 183.19 | 123.36 | 128.33 |
| 14 | 220.69 | 100 | 95.55 | 120.06 | 113.63 | 101.21 | 108.12 | 172.21 | 176.56 | 132.2 | 120.06 | 189.89 | 122.23 | 127.51 |
| 15 | 230.63 | 100 | 94.39 | 118.8 | 111.8 | 99.96 | 106.79 | 177.89 | 180.8 | 131.21 | 118.8 | 196.5 | 120.72 | 126.28 |
| 16 | 240.64 | 100 | 93.11 | 117.35 | 110.6 | 98.59 | 105.32 | 183.59 | 184.91 | 129.93 | 117.35 | 202.95 | 118.79 | 124.61 |
| 17 | 250.7 | 100 | 91.7 | 115.7 | 108.91 | 97.1 | 103.72 | 189.31 | 188.88 | 128.37 | 115.7 | 209.21 | 116.41 | 122.47 |
| 18 | 260.75 | 100 | 90.18 | 113.87 | 106.71 | 95.48 | 101.98 | 195 | 192.72 | 126.55 | 113.87 | 215.19 | 113.54 | 119.82 |
| 19 | 270.74 | 100 | 88.54 | 111.87 | 105.08 | 93.74 | 100.1 | 200.64 | 196.46 | 124.49 | 111.87 | 220.79 | 110.13 | 116.62 |
| 20 | 280.61 | 100 | 86.81 | 109.72 | 102.98 | 91.88 | 98.11 | 206.18 | 200.13 | 122.22 | 109.72 | 225.91 | 106.12 | 112.81 |
| 21 | 290.37 | 100 | 84.99 | 107.45 | 100.43 | 89.92 | 96.01 | 211.64 | 203.71 | 119.78 | 107.45 | 230.41 | 101.38 | 108.28 |
| 22 | 300 | 100 | 83.08 | 105.06 | 98.44 | 87.9 | 93.82 | 216.99 | 207.16 | 117.18 | 105.06 | 234.06 | 95.72 | 102.89 |
| 23 | 309.49 | 100 | 81.1 | 102.57 | 96.07 | 85.8 | 91.56 | 222.24 | 210.51 | 114.44 | 102.57 | 236.41 | 88.82 | 96.4 |
| 24 | 318.79 | 100 | 79.06 | 100 | 93.3 | 83.63 | 89.23 | 227.35 | 213.77 | 111.59 | 100 | 236.41 | 79.82 | 88.28 |
| 25 | 62.07 | 100 | 14.57 | 100 | 17.24 | 15.41 | 16.44 | 43.98 | 65.2 | 62.07 | 62.07 | 46.03 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:OTHER. +5% LAPSE

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 18.81 | 25.78 | 25.25 | 20.49 | 18.81 | 20.96 | 20.96 | 18.81 | 18.81 | 19.96 | 20.49 | 20.49 | 20.49 | 20.49 |
| 2 | 10.49 | 13.73 | 13.68 | 12.05 | 10.49 | 13.42 | 12.8 | 12.65 | 11.15 | 11.61 | 12.05 | 11.12 | 12.1 | 11.9 |
| 3 | 8.11 | 10.11 | 10.17 | 9.61 | 8.11 | 11.42 | 10.18 | 9.43 | 8.76 | 9.24 | 9.61 | 8.5 | 9.58 | 9.41 |
| 4 | 6.73 | 7.97 | 8.07 | 8.07 | 10.21 | 8.7 | 8.43 | 7.59 | 7.32 | 7.8 | 8.07 | 6.98 | 8.01 | 7.88 |
| 5 | 5.79 | 6.5 | 6.61 | 6.93 | 8.55 | 7.06 | 7.1 | 6.34 | 6.32 | 6.76 | 6.93 | 5.95 | 6.86 | 6.77 |
| 6 | 5.08 | 5.39 | 5.5 | 5.99 | 7.25 | 5.86 | 6.02 | 5.4 | 5.53 | 5.91 | 5.99 | 5.17 | 5.92 | 5.87 |
| 7 | 4.5 | 4.51 | 4.61 | 5.18 | 5.42 | 4.9 | 5.11 | 4.66 | 4.87 | 5.17 | 5.18 | 4.54 | 5.13 | 5.1 |
| 8 | 4.03 | 3.81 | 3.9 | 4.49 | 4.68 | 4.14 | 4.35 | 4.05 | 4.32 | 4.54 | 4.49 | 4.02 | 4.46 | 4.45 |
| 9 | 3.62 | 3.23 | 3.31 | 3.89 | 4.06 | 3.51 | 3.71 | 3.55 | 3.84 | 3.98 | 3.89 | 3.58 | 3.87 | 3.89 |
| 10 | 3.28 | 2.76 | 2.84 | 3.38 | 3.3 | 3 | 3.19 | 3.14 | 3.43 | 3.5 | 3.38 | 3.22 | 3.38 | 3.41 |
| 11 | 2.96 | 2.34 | 2.41 | 2.91 | 2.87 | 2.56 | 2.72 | 2.77 | 3.03 | 3.04 | 2.91 | 2.87 | 2.92 | 2.95 |
| 12 | 2.73 | 2.01 | 2.08 | 2.53 | 2.52 | 2.2 | 2.35 | 2.48 | 2.73 | 2.68 | 2.53 | 2.62 | 2.56 | 2.6 |
| 13 | 2.52 | 1.74 | 1.79 | 2.2 | 2.09 | 1.9 | 2.03 | 2.24 | 2.46 | 2.35 | 2.2 | 2.39 | 2.24 | 2.28 |
| 14 | 2.34 | 1.51 | 1.55 | 1.92 | 1.85 | 1.64 | 1.75 | 2.03 | 2.22 | 2.07 | 1.92 | 2.19 | 1.96 | 2.01 |
| 15 | 2.18 | 1.32 | 1.34 | 1.67 | 1.63 | 1.42 | 1.52 | 1.85 | 2.02 | 1.81 | 1.67 | 2.02 | 1.72 | 1.77 |
| 16 | 2.05 | 1.15 | 1.17 | 1.46 | 1.36 | 1.24 | 1.32 | 1.7 | 1.83 | 1.59 | 1.46 | 1.87 | 1.51 | 1.56 |
| 17 | 1.93 | 1.02 | 1.02 | 1.28 | 1.21 | 1.08 | 1.15 | 1.58 | 1.68 | 1.4 | 1.28 | 1.74 | 1.33 | 1.38 |
| 18 | 1.83 | .9 | .89 | 1.12 | 1.07 | .94 | 1.01 | 1.46 | 1.54 | 1.23 | 1.12 | 1.63 | 1.17 | 1.21 |
| 19 | 1.74 | .8 | .78 | .98 | .91 | .82 | .88 | 1.37 | 1.41 | 1.08 | .98 | 1.53 | 1.02 | 1.07 |
| 20 | 1.66 | .71 | .68 | .86 | .81 | .72 | .77 | 1.28 | 1.3 | .95 | .86 | 1.44 | .89 | .94 |
| 21 | 1.6 | .64 | .6 | .75 | .72 | .63 | .67 | 1.21 | 1.21 | .84 | .75 | 1.36 | .78 | .82 |
| 22 | 1.56 | .59 | .53 | .66 | .62 | .56 | .59 | 1.16 | 1.14 | .74 | .66 | 1.3 | .68 | .71 |
| 23 | 1.52 | .54 | .46 | .59 | .55 | .49 | .52 | 1.11 | 1.08 | .65 | .59 | 1.23 | .58 | .61 |
| 24 | 1.48 | .49 | .41 | .52 | .49 | .43 | .46 | 1.07 | 1.02 | .58 | .52 | 1.17 | .48 | .51 |
| 25 | 1.46 | .46 | .36 | .46 | .43 | .38 | .41 | 1.04 | .98 | .51 | .46 | 1.08 | .36 | .4 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 72.97 | 100 | 97.97 | 79.48 | 72.97 | 81.31 | 81.31 | 72.97 | 72.97 | 77.44 | 79.48 | 79.48 | 79.48 | 79.48 |
| 2 | 76.35 | 100 | 99.59 | 87.75 | 76.35 | 97.72 | 93.18 | 92.15 | 81.18 | 84.54 | 87.75 | 81 | 88.09 | 86.67 |
| 3 | 80.17 | 100 | 100.62 | 95.01 | 80.17 | 112.98 | 100.68 | 93.28 | 86.63 | 91.38 | 95.01 | 84.05 | 94.76 | 93.09 |
| 4 | 84.44 | 100 | 101.26 | 101.29 | 128.13 | 109.12 | 105.8 | 95.23 | 91.91 | 97.87 | 101.29 | 87.62 | 100.5 | 98.89 |
| 5 | 89.15 | 100 | 101.71 | 106.65 | 131.61 | 108.7 | 109.24 | 97.6 | 97.21 | 103.95 | 106.65 | 91.62 | 105.52 | 104.14 |
| 6 | 94.27 | 100 | 102.06 | 111.19 | 134.55 | 108.65 | 111.61 | 100.28 | 102.56 | 109.58 | 111.19 | 95.96 | 109.91 | 108.87 |
| 7 | 99.78 | 100 | 102.29 | 114.92 | 120.17 | 108.76 | 113.26 | 103.25 | 107.92 | 114.66 | 114.92 | 100.59 | 113.74 | 113.14 |
| 8 | 105.74 | 100 | 102.47 | 118 | 123.02 | 108.82 | 114.34 | 106.51 | 113.36 | 119.23 | 118 | 105.58 | 117.09 | 116.98 |
| 9 | 112.15 | 100 | 102.53 | 120.45 | 125.66 | 108.84 | 115.06 | 110.06 | 118.84 | 123.24 | 120.45 | 110.89 | 120 | 120.41 |
| 10 | 119.08 | 100 | 102.91 | 122.81 | 119.74 | 108.9 | 115.57 | 113.93 | 124.43 | 127.12 | 122.81 | 116.69 | 122.59 | 123.55 |
| 11 | 126.85 | 100 | 103 | 124.49 | 122.86 | 109.35 | 116.3 | 118.39 | 129.82 | 130.32 | 124.49 | 122.92 | 124.84 | 126.42 |
| 12 | 135.42 | 100 | 102.99 | 125.76 | 125.21 | 109.32 | 116.42 | 123.31 | 135.6 | 133.01 | 125.76 | 129.8 | 126.83 | 128.97 |
| 13 | 144.69 | 100 | 102.84 | 126.6 | 120.14 | 109.03 | 116.36 | 128.66 | 141.37 | 135.14 | 126.6 | 137.14 | 128.48 | 131.16 |
| 14 | 154.73 | 100 | 102.52 | 127.02 | 122.22 | 108.68 | 116.06 | 134.46 | 147.18 | 136.71 | 127.02 | 144.96 | 129.76 | 132.97 |
| 15 | 165.6 | 100 | 101.99 | 127.02 | 123.74 | 108.11 | 115.5 | 140.74 | 153.03 | 137.7 | 127.02 | 153.3 | 130.63 | 134.34 |
| 16 | 177.33 | 100 | 101.2 | 126.53 | 118.22 | 107.27 | 114.63 | 147.52 | 158.92 | 138.03 | 126.53 | 162.11 | 131 | 135.18 |
| 17 | 189.96 | 100 | 100.17 | 125.65 | 119.1 | 106.11 | 113.4 | 154.79 | 164.93 | 137.8 | 125.65 | 171.42 | 130.79 | 135.4 |
| 18 | 203.47 | 100 | 98.85 | 124.29 | 119.25 | 104.71 | 111.9 | 162.56 | 170.81 | 136.92 | 124.29 | 181.12 | 129.88 | 134.91 |
| 19 | 217.88 | 100 | 97.21 | 122.47 | 113.71 | 102.96 | 110.01 | 170.81 | 176.7 | 135.4 | 122.47 | 191.14 | 128.15 | 133.55 |
| 20 | 233.16 | 100 | 95.16 | 120.04 | 113.06 | 100.82 | 107.71 | 179.53 | 182.48 | 133.12 | 120.04 | 201.31 | 125.4 | 131.13 |
| 21 | 249.21 | 100 | 92.68 | 117.03 | 111.21 | 98.17 | 104.87 | 188.64 | 188.59 | 130.08 | 117.03 | 211.42 | 121.38 | 127.37 |
| 22 | 265.91 | 100 | 89.82 | 113.51 | 105.47 | 95.07 | 101.55 | 198.04 | 194.95 | 126.38 | 113.51 | 221.15 | 115.74 | 121.96 |
| 23 | 283.18 | 100 | 86.59 | 109.47 | 102.66 | 91.62 | 97.83 | 207.69 | 201.22 | 122.04 | 109.47 | 229.9 | 107.97 | 114.42 |
| 24 | 300.86 | 100 | 82.99 | 104.96 | 98.63 | 87.8 | 93.72 | 217.5 | 207.5 | 117.08 | 104.96 | 236.41 | 97.15 | 103.92 |
| 25 | 318.79 | 100 | 79.06 | 100 | 93.3 | 83.63 | 89.23 | 227.35 | 213.77 | 111.59 | 100 | 236.41 | 79.82 | 88.28 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:COMMS. +5% LAPSE

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 70.88 | 62.79 | 65.26 | 69.42 | 70.88 | 69.01 | 69.01 | 70.88 | 70.88 | 69.88 | 69.42 | 69.21 | 69.21 | 69.42 |
| 2 | 77.76 | 64.24 | 67.16 | 73.27 | 77.76 | 72.17 | 72.85 | 75.37 | 76.63 | 75.25 | 74.19 | 75.17 | 74.37 | 74.35 |
| 3 | 74.89 | 57.98 | 60.89 | 67.9 | 74.89 | 64.84 | 67.07 | 70.71 | 72.45 | 70.81 | 69.21 | 71.67 | 69.54 | 69.62 |
| 4 | 72.24 | 52.75 | 55.38 | 62.66 | 67.74 | 58.84 | 61.59 | 66.61 | 68.41 | 66.45 | 64.37 | 68.49 | 64.87 | 65.06 |
| 5 | 69.7 | 48.25 | 50.41 | 57.58 | 61.01 | 53.5 | 56.42 | 62.87 | 64.47 | 62.12 | 59.64 | 65.47 | 60.32 | 60.61 |
| 6 | 62.63 | 41.01 | 42.75 | 49.53 | 50.92 | 45.35 | 48.05 | 55.35 | 56.64 | 53.9 | 51.3 | 58.26 | 51.92 | 52.45 |
| 7 | 56.36 | 34.95 | 36.33 | 42.57 | 43.38 | 38.52 | 40.94 | 48.87 | 49.77 | 46.71 | 44.09 | 51.94 | 44.68 | 45.35 |
| 8 | 50.76 | 29.84 | 30.9 | 36.53 | 36.86 | 32.76 | 34.88 | 43.23 | 43.72 | 40.39 | 37.84 | 46.33 | 38.4 | 39.15 |
| 9 | 45.72 | 25.5 | 26.3 | 31.3 | 31.21 | 27.87 | 29.71 | 38.28 | 38.37 | 34.85 | 32.43 | 41.34 | 32.96 | 33.74 |
| 10 | 41.15 | 21.8 | 22.35 | 26.76 | 26.62 | 23.69 | 25.28 | 33.91 | 33.61 | 29.98 | 27.72 | 36.86 | 28.22 | 29 |
| 11 | 37.03 | 18.66 | 19 | 22.85 | 22.62 | 20.13 | 21.5 | 30.06 | 29.43 | 25.74 | 23.67 | 32.85 | 24.13 | 24.89 |
| 12 | 33.23 | 15.95 | 16.11 | 19.44 | 19.11 | 17.07 | 18.23 | 26.6 | 25.69 | 22.01 | 20.14 | 29.2 | 20.55 | 21.27 |
| 13 | 29.73 | 13.61 | 13.62 | 16.48 | 16.2 | 14.43 | 15.41 | 23.48 | 22.35 | 18.73 | 17.07 | 25.87 | 17.43 | 18.09 |
| 14 | 26.47 | 11.58 | 11.46 | 13.9 | 13.63 | 12.14 | 12.97 | 20.66 | 19.35 | 15.86 | 14.4 | 22.82 | 14.69 | 15.29 |
| 15 | 23.43 | 9.81 | 9.59 | 11.65 | 11.36 | 10.16 | 10.85 | 18.07 | 16.66 | 13.33 | 12.07 | 20 | 12.28 | 12.83 |
| 16 | 20.58 | 8.26 | 7.96 | 9.69 | 9.46 | 8.43 | 9.01 | 15.7 | 14.24 | 11.11 | 10.04 | 17.39 | 10.17 | 10.66 |
| 17 | 17.89 | 6.89 | 6.55 | 7.97 | 7.77 | 6.93 | 7.4 | 13.51 | 12.05 | 9.16 | 8.26 | 14.96 | 8.32 | 8.74 |
| 18 | 15.35 | 5.68 | 5.31 | 6.47 | 6.28 | 5.62 | 6 | 11.48 | 10.06 | 7.45 | 6.7 | 12.69 | 6.69 | 7.05 |
| 19 | 12.92 | 4.61 | 4.23 | 5.15 | 5.02 | 4.47 | 4.78 | 9.58 | 8.26 | 5.94 | 5.34 | 10.56 | 5.26 | 5.57 |
| 20 | 10.61 | 3.65 | 3.28 | 4 | 3.89 | 3.47 | 3.71 | 7.79 | 6.61 | 4.62 | 4.15 | 8.55 | 4.01 | 4.26 |
| 21 | 8.37 | 2.78 | 2.45 | 2.99 | 2.9 | 2.59 | 2.77 | 6.1 | 5.1 | 3.45 | 3.1 | 6.66 | 2.92 | 3.12 |
| 22 | 6.21 | 2 | 1.72 | 2.1 | 2.04 | 1.82 | 1.94 | 4.49 | 3.7 | 2.42 | 2.17 | 4.85 | 1.98 | 2.13 |
| 23 | 4.09 | 1.28 | 1.07 | 1.31 | 1.27 | 1.14 | 1.21 | 2.94 | 2.39 | 1.51 | 1.36 | 3.13 | 1.18 | 1.28 |
| 24 | 2.03 | .61 | .5 | .61 | .59 | .53 | .57 | 1.45 | 1.16 | .71 | .64 | 1.51 | .51 | .56 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 112.89 | 100 | 103.93 | 110.56 | 112.89 | 109.9 | 109.9 | 112.89 | 112.89 | 111.29 | 110.56 | 110.22 | 110.22 | 110.56 |
| 2 | 121.04 | 100 | 104.55 | 114.06 | 121.04 | 112.34 | 113.41 | 117.33 | 119.29 | 117.14 | 115.49 | 117.02 | 115.76 | 115.74 |
| 3 | 129.16 | 100 | 105.01 | 117.11 | 129.16 | 111.83 | 115.68 | 121.95 | 124.95 | 122.13 | 119.37 | 123.62 | 119.94 | 120.08 |
| 4 | 136.94 | 100 | 104.97 | 118.78 | 128.41 | 111.53 | 116.76 | 126.27 | 129.68 | 125.96 | 122.02 | 129.83 | 122.97 | 123.33 |
| 5 | 144.44 | 100 | 104.46 | 119.33 | 126.44 | 110.87 | 116.92 | 130.3 | 133.61 | 128.75 | 123.61 | 135.69 | 125 | 125.62 |
| 6 | 152.71 | 100 | 104.24 | 120.77 | 124.16 | 110.58 | 117.16 | 134.96 | 138.1 | 131.44 | 125.1 | 142.06 | 126.61 | 127.88 |
| 7 | 161.26 | 100 | 103.95 | 121.78 | 124.1 | 110.22 | 117.13 | 139.82 | 142.4 | 133.63 | 126.15 | 148.59 | 127.84 | 129.74 |
| 8 | 170.13 | 100 | 103.57 | 122.43 | 123.53 | 109.79 | 116.9 | 144.87 | 146.52 | 135.37 | 126.82 | 155.28 | 128.71 | 131.2 |
| 9 | 179.31 | 100 | 103.12 | 122.76 | 122.4 | 109.29 | 116.51 | 150.12 | 150.45 | 136.68 | 127.16 | 162.12 | 129.25 | 132.31 |
| 10 | 188.81 | 100 | 102.53 | 122.75 | 122.12 | 108.69 | 115.97 | 155.58 | 154.18 | 137.53 | 127.16 | 169.09 | 129.46 | 133.04 |
| 11 | 198.47 | 100 | 101.83 | 122.46 | 121.26 | 107.92 | 115.21 | 161.12 | 157.72 | 137.96 | 126.85 | 176.08 | 129.34 | 133.39 |
| 12 | 208.35 | 100 | 101 | 121.9 | 119.83 | 107.01 | 114.3 | 166.79 | 161.06 | 137.99 | 126.27 | 183.1 | 128.87 | 133.36 |
| 13 | 218.41 | 100 | 100.05 | 121.09 | 119.03 | 105.99 | 113.23 | 172.55 | 164.2 | 137.64 | 125.44 | 190.11 | 128.04 | 132.93 |
| 14 | 228.6 | 100 | 98.98 | 120.06 | 117.7 | 104.84 | 112 | 178.38 | 167.14 | 136.95 | 124.36 | 197.07 | 126.83 | 132.08 |
| 15 | 238.9 | 100 | 97.77 | 118.8 | 115.81 | 103.55 | 110.62 | 184.27 | 169.89 | 135.92 | 123.06 | 203.92 | 125.22 | 130.81 |
| 16 | 249.27 | 100 | 96.45 | 117.35 | 114.56 | 102.13 | 109.1 | 190.18 | 172.46 | 134.59 | 121.56 | 210.62 | 123.19 | 129.08 |
| 17 | 259.69 | 100 | 94.99 | 115.7 | 112.82 | 100.58 | 107.44 | 196.1 | 174.84 | 132.97 | 119.85 | 217.12 | 120.69 | 126.86 |
| 18 | 270.1 | 100 | 93.42 | 113.87 | 110.54 | 98.91 | 105.63 | 201.99 | 177.08 | 131.09 | 117.95 | 223.32 | 117.7 | 124.12 |
| 19 | 280.45 | 100 | 91.72 | 111.87 | 108.85 | 97.1 | 103.69 | 207.83 | 179.2 | 128.95 | 115.88 | 229.14 | 114.15 | 120.8 |
| 20 | 290.68 | 100 | 89.92 | 109.72 | 106.68 | 95.17 | 101.62 | 213.58 | 181.29 | 126.61 | 113.65 | 234.45 | 109.97 | 116.85 |
| 21 | 300.78 | 100 | 88.03 | 107.45 | 104.03 | 93.15 | 99.45 | 219.22 | 183.3 | 124.08 | 111.3 | 239.12 | 105.05 | 112.17 |
| 22 | 310.76 | 100 | 86.06 | 105.06 | 101.97 | 91.05 | 97.19 | 224.77 | 185.19 | 121.38 | 108.83 | 242.91 | 99.17 | 106.58 |
| 23 | 320.58 | 100 | 84.01 | 102.57 | 99.51 | 88.87 | 94.84 | 230.21 | 186.99 | 118.54 | 106.25 | 245.35 | 92.01 | 99.85 |
| 24 | 330.22 | 100 | 81.9 | 100 | 96.65 | 86.63 | 92.43 | 235.51 | 188.72 | 115.59 | 103.59 | 245.35 | 82.68 | 91.44 |
| 25 | 61.9 | 100 | 14.53 | 100 | 17.2 | 15.37 | 16.4 | 43.86 | 64.57 | 61.9 | 61.9 | 45.99 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:COMMS. +5% LAPSE

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 29.12 | 37.21 | 34.74 | 30.58 | 29.12 | 30.99 | 30.99 | 29.12 | 29.12 | 30.12 | 30.58 | 30.79 | 30.79 | 30.58 |
| 2 | -6.87 | -1.45 | -1.9 | -3.86 | -6.87 | -3.16 | -3.85 | -4.49 | -5.75 | -5.38 | -4.77 | -5.97 | -5.16 | -4.94 |
| 3 | 2.87 | 6.26 | 6.27 | 5.38 | 2.87 | 7.33 | 5.78 | 4.66 | 4.18 | 4.45 | 4.98 | 3.5 | 4.83 | 4.73 |
| 4 | 2.65 | 5.23 | 5.51 | 5.24 | 7.15 | 6 | 5.48 | 4.1 | 4.04 | 4.36 | 4.84 | 3.18 | 4.67 | 4.56 |
| 5 | 2.54 | 4.5 | 4.97 | 5.08 | 6.73 | 5.34 | 5.18 | 3.74 | 3.94 | 4.33 | 4.73 | 3.02 | 4.55 | 4.45 |
| 6 | 7.07 | 7.24 | 7.66 | 8.05 | 10.09 | 8.15 | 8.37 | 7.52 | 7.84 | 8.22 | 8.34 | 7.21 | 8.39 | 8.17 |
| 7 | 6.26 | 6.06 | 6.42 | 6.96 | 7.54 | 6.83 | 7.11 | 6.48 | 6.86 | 7.2 | 7.21 | 6.32 | 7.24 | 7.1 |
| 8 | 5.6 | 5.11 | 5.43 | 6.04 | 6.52 | 5.77 | 6.06 | 5.64 | 6.05 | 6.32 | 6.25 | 5.6 | 6.28 | 6.2 |
| 9 | 5.04 | 4.34 | 4.61 | 5.23 | 5.65 | 4.89 | 5.17 | 4.95 | 5.35 | 5.54 | 5.41 | 4.99 | 5.45 | 5.41 |
| 10 | 4.57 | 3.7 | 3.95 | 4.55 | 4.59 | 4.18 | 4.43 | 4.37 | 4.76 | 4.88 | 4.71 | 4.48 | 4.74 | 4.74 |
| 11 | 4.13 | 3.14 | 3.35 | 3.91 | 4 | 3.56 | 3.78 | 3.85 | 4.18 | 4.24 | 4.05 | 4 | 4.09 | 4.11 |
| 12 | 3.8 | 2.71 | 2.89 | 3.4 | 3.51 | 3.07 | 3.26 | 3.46 | 3.74 | 3.73 | 3.53 | 3.65 | 3.58 | 3.62 |
| 13 | 3.51 | 2.34 | 2.49 | 2.96 | 2.91 | 2.64 | 2.82 | 3.12 | 3.34 | 3.28 | 3.07 | 3.33 | 3.13 | 3.18 |
| 14 | 3.26 | 2.03 | 2.16 | 2.58 | 2.57 | 2.29 | 2.44 | 2.83 | 2.99 | 2.88 | 2.67 | 3.06 | 2.74 | 2.8 |
| 15 | 3.04 | 1.77 | 1.87 | 2.25 | 2.27 | 1.98 | 2.12 | 2.58 | 2.69 | 2.53 | 2.33 | 2.82 | 2.4 | 2.46 |
| 16 | 2.85 | 1.55 | 1.63 | 1.96 | 1.9 | 1.72 | 1.84 | 2.37 | 2.42 | 2.22 | 2.03 | 2.61 | 2.11 | 2.17 |
| 17 | 2.69 | 1.37 | 1.42 | 1.72 | 1.69 | 1.5 | 1.61 | 2.19 | 2.19 | 1.95 | 1.78 | 2.43 | 1.86 | 1.92 |
| 18 | 2.55 | 1.21 | 1.24 | 1.5 | 1.49 | 1.31 | 1.4 | 2.03 | 1.99 | 1.71 | 1.56 | 2.27 | 1.63 | 1.69 |
| 19 | 2.42 | 1.07 | 1.08 | 1.32 | 1.27 | 1.15 | 1.22 | 1.9 | 1.8 | 1.51 | 1.36 | 2.13 | 1.43 | 1.49 |
| 20 | 2.32 | .96 | .94 | 1.15 | 1.12 | 1 | 1.07 | 1.78 | 1.64 | 1.32 | 1.19 | 2 | 1.25 | 1.3 |
| 21 | 2.23 | .86 | .83 | 1.01 | 1 | .88 | .94 | 1.69 | 1.51 | 1.17 | 1.05 | 1.9 | 1.09 | 1.14 |
| 22 | 2.17 | .79 | .73 | .89 | .86 | .78 | .83 | 1.61 | 1.41 | 1.03 | .93 | 1.81 | .94 | .99 |
| 23 | 2.11 | .72 | .65 | .79 | .77 | .68 | .73 | 1.55 | 1.31 | .91 | .82 | 1.72 | .81 | .85 |
| 24 | 2.07 | .66 | .57 | .7 | .68 | .6 | .64 | 1.49 | 1.23 | .8 | .72 | 1.63 | .67 | .71 |
| 25 | 2.03 | .61 | .5 | .61 | .59 | .53 | .57 | 1.45 | 1.16 | .71 | .64 | 1.51 | .51 | .56 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 78.25 | 100 | 93.37 | 82.19 | 78.25 | 83.29 | 83.29 | 78.25 | 78.25 | 80.95 | 82.19 | 82.76 | 82.76 | 82.19 |
| 2 | 474.03 | 100 | 131.33 | 265.95 | 474.03 | 217.95 | 265.24 | 309.56 | 396.43 | 370.76 | 329.16 | 411.47 | 355.89 | 340.33 |
| 3 | 45.84 | 100 | 100.23 | 85.89 | 45.84 | 117.09 | 92.35 | 74.52 | 66.83 | 71.01 | 79.52 | 55.88 | 77.11 | 75.58 |
| 4 | 50.62 | 100 | 105.45 | 100.2 | 136.77 | 114.84 | 104.83 | 78.38 | 77.22 | 83.41 | 92.63 | 60.93 | 89.33 | 87.26 |
| 5 | 56.53 | 100 | 110.39 | 112.9 | 149.5 | 118.56 | 114.97 | 83.07 | 87.52 | 96.1 | 105.05 | 67.03 | 101.19 | 98.83 |
| 6 | 97.65 | 100 | 105.72 | 111.19 | 139.37 | 112.55 | 115.61 | 103.88 | 108.21 | 113.51 | 115.17 | 99.58 | 115.88 | 112.78 |
| 7 | 103.36 | 100 | 105.96 | 114.92 | 124.48 | 112.66 | 117.32 | 106.96 | 113.27 | 118.77 | 119.04 | 104.39 | 119.53 | 117.19 |
| 8 | 109.53 | 100 | 106.14 | 118 | 127.43 | 112.72 | 118.44 | 110.33 | 118.37 | 123.51 | 122.23 | 109.57 | 122.74 | 121.17 |
| 9 | 116.17 | 100 | 106.21 | 120.45 | 130.17 | 112.75 | 119.19 | 114.01 | 123.43 | 127.65 | 124.77 | 115.08 | 125.52 | 124.73 |
| 10 | 123.35 | 100 | 106.61 | 122.81 | 124.04 | 112.81 | 119.71 | 118.01 | 128.52 | 131.68 | 127.21 | 121.1 | 128.02 | 127.98 |
| 11 | 131.39 | 100 | 106.7 | 124.49 | 127.26 | 113.27 | 120.47 | 122.64 | 133.12 | 134.99 | 128.96 | 127.57 | 130.19 | 130.96 |
| 12 | 140.27 | 100 | 106.68 | 125.76 | 129.7 | 113.24 | 120.59 | 127.74 | 138.06 | 137.78 | 130.27 | 134.71 | 132.11 | 133.59 |
| 13 | 149.88 | 100 | 106.53 | 126.6 | 124.45 | 112.94 | 120.53 | 133.27 | 142.82 | 139.99 | 131.14 | 142.32 | 133.7 | 135.86 |
| 14 | 160.28 | 100 | 106.2 | 127.02 | 126.6 | 112.58 | 120.22 | 139.28 | 147.44 | 141.62 | 131.57 | 150.44 | 134.93 | 137.74 |
| 15 | 171.54 | 100 | 105.65 | 127.02 | 128.18 | 111.98 | 119.64 | 145.79 | 151.9 | 142.63 | 131.57 | 159.09 | 135.74 | 139.16 |
| 16 | 183.69 | 100 | 104.82 | 126.53 | 122.46 | 111.11 | 118.74 | 152.81 | 156.21 | 142.98 | 131.07 | 168.24 | 136.05 | 140.03 |
| 17 | 196.77 | 100 | 103.77 | 125.65 | 123.37 | 109.91 | 117.47 | 160.34 | 160.46 | 142.74 | 130.16 | 177.9 | 135.77 | 140.26 |
| 18 | 210.77 | 100 | 102.4 | 124.29 | 123.53 | 108.46 | 115.91 | 168.38 | 164.31 | 141.83 | 128.75 | 187.96 | 134.77 | 139.74 |
| 19 | 225.7 | 100 | 100.7 | 122.47 | 117.78 | 106.65 | 113.95 | 176.94 | 167.96 | 140.26 | 126.86 | 198.37 | 132.93 | 138.33 |
| 20 | 241.52 | 100 | 98.57 | 120.04 | 117.11 | 104.44 | 111.57 | 185.97 | 171.27 | 137.89 | 124.35 | 208.91 | 130.04 | 135.83 |
| 21 | 258.15 | 100 | 96 | 117.03 | 115.2 | 101.69 | 108.63 | 195.4 | 174.81 | 134.75 | 121.23 | 219.41 | 125.83 | 131.94 |
| 22 | 275.45 | 100 | 93.04 | 113.51 | 109.25 | 98.48 | 105.19 | 205.14 | 178.52 | 130.92 | 117.58 | 229.51 | 119.96 | 126.33 |
| 23 | 293.34 | 100 | 89.69 | 109.47 | 106.34 | 94.91 | 101.34 | 215.14 | 181.99 | 126.41 | 113.4 | 238.59 | 111.88 | 118.52 |
| 24 | 311.65 | 100 | 85.97 | 104.96 | 102.16 | 90.95 | 97.08 | 225.29 | 185.38 | 121.28 | 108.72 | 245.35 | 100.65 | 107.65 |
| 25 | 330.22 | 100 | 81.9 | 100 | 96.65 | 86.63 | 92.43 | 235.51 | 188.72 | 115.59 | 103.59 | 245.35 | 82.68 | 91.44 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
+5% LAPSE
(NON-RESERVE STATISTICS HAVE BEEN MULTIPLIED BY 10)

| | | | | DYNAMIC METHODS ASSET | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOB STATIC | FORMULA | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| OTHER-EPHS-ASSET | -DIFF | 2272 | 0 | -22 | 734 | 785 | 261 | 458 | 1454 | 1654 | 979 | 734 | 1716 | 753 | 844 |
| | -ABS(DIFF) | 2272 | 0 | 74 | 734 | 787 | 291 | 466 | 1454 | 1654 | 979 | 734 | 1716 | 758 | 846 |
| | -DIFF*2 | 25767 | 0 | 28 | 3927 | 5806 | 914 | 1882 | 10658 | 14599 | 6357 | 3927 | 14991 | 4121 | 4889 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 290 | 0 | 20 | 150 | 245 | 107 | 117 | 185 | 235 | 180 | 150 | 225 | 151 | 159 |
| | -DIFF*2 | 778 | 0 | 4 | 348 | 794 | 267 | 266 | 551 | 647 | 441 | 348 | 461 | 346 | 358 |
| COMMS-EPHS-ASSET | -DIFF | 3256 | 0 | 161 | 977 | 1189 | 510 | 777 | 2135 | 2075 | 1479 | 1148 | 2513 | 1201 | 1300 |
| | -ABS(DIFF) | 3256 | 0 | 221 | 977 | 1190 | 529 | 780 | 2135 | 2075 | 1479 | 1148 | 2513 | 1206 | 1301 |
| | -DIFF*2 | 53671 | 0 | 427 | 6937 | 12376 | 2671 | 5015 | 23328 | 24062 | 14499 | 9451 | 32704 | 10425 | 11539 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 432 | 0 | 66 | 198 | 339 | 162 | 183 | 292 | 324 | 277 | 232 | 345 | 244 | 248 |
| | -DIFF*2 | 1436 | 0 | 73 | 572 | 1325 | 470 | 511 | 903 | 1038 | 822 | 663 | 921 | 679 | 691 |
| OTHER-EPHS-BENEFIT RES DIF | | 8 | 0 | 6 | 9 | 14 | 20 | 18 | 8 | 8 | 8 | 9 | 8 | 14 | 12 |
| RESERVE INC DIF | | 7 | 0 | 5 | 8 | 11 | 11 | 15 | 3 | 3 | 5 | 8 | 5 | 11 | 7 |
| COMMS-EPHS-BENEFIT RES DIF | | 8 | 0 | 18 | 9 | 12 | 22 | 16 | 8 | 8 | 8 | 8 | 8 | 14 | 12 |
| RESERVE INC DIF | | 5 | 0 | 9 | 8 | 9 | 13 | 11 | 3 | 3 | 3 | 5 | 5 | 7 | 5 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

RANK OF STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS +5% LAPSE

| LOB STATIC | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS-ASSET | 1 | 5 | 7.9 | 2 | 3 | 10 | 11 | 9 | 4 | 12 | 6 | 7.1 |
| -AMORT | 1 | 4.9 | 12 | 2.9 | 2.1 | 9.9 | 11 | 8 | 5.9 | 9.1 | 4.2 | 7 |
| COMMS-EPHS-ASSET | 1 | 4 | 7.8 | 2 | 3 | 10.1 | 10.9 | 9 | 5 | 12 | 6.1 | 7.1 |
| -AMORT | 1 | 4 | 11.9 | 2 | 3 | 9 | 10.9 | 8 | 5 | 10.2 | 6 | 7 |

APPENDIX 2—*Continued*

INPUT FOR DYNAMIC METHOD COMPARISON TESTS
5%+110% LAPSE

| YEAR | TOTAL EXP. TERMINA-TIONS(%) | ENDING EXPECTED L(T) | TOTAL ACT. TERMINA-TIONS(%) | ENDING ACTUAL L(T) | INTEREST (%) | COMMISSION (%) |
|---|---|---|---|---|---|---|
| 1 | 37 | .63 | 45.7 | .543 | 7.500 | 55.0 |
| 2 | 19.1 | .5097 | 26.01 | .4018 | 7.500 | 20.0 |
| 3 | 14.8 | .4342 | 21.28 | .3163 | 7.500 | 10.0 |
| 4 | 12.6 | .3795 | 18.86 | .2566 | 7.500 | 9.0 |
| 5 | 11.5 | .3359 | 17.65 | .2113 | 7.500 | 8.0 |
| 6 | 10.9 | .2993 | 16.99 | .1754 | 7.500 | .0 |
| 7 | 10.3 | .2684 | 16.33 | .1468 | 7.500 | .0 |
| 8 | 10 | .2416 | 16 | .1233 | 7.500 | .0 |
| 9 | 9.6 | .2184 | 15.56 | .1041 | 7.500 | .0 |
| 10 | 10.4 | .1957 | 16.44 | .087 | 7.500 | .0 |
| 11 | 9.4 | .1773 | 15.34 | .0736 | 7.367 | .0 |
| 12 | 9.3 | .1608 | 15.23 | .0624 | 7.233 | .0 |
| 13 | 9.1 | .1462 | 15.01 | .0531 | 7.100 | .0 |
| 14 | 8.9 | .1332 | 14.79 | .0452 | 6.967 | .0 |
| 15 | 8.7 | .1216 | 14.57 | .0386 | 6.833 | .0 |
| 16 | 8.4 | .1114 | 14.24 | .0331 | 6.700 | .0 |
| 17 | 8.4 | .102 | 14.24 | .0284 | 6.567 | .0 |
| 18 | 8.2 | .0936 | 14.02 | .0244 | 6.433 | .0 |
| 19 | 8.1 | .0861 | 13.91 | .021 | 6.300 | .0 |
| 20 | 7.6 | .0795 | 13.36 | .0182 | 6.167 | .0 |
| 21 | 7.2 | .0738 | 12.92 | .0159 | 6.033 | .0 |
| 22 | 7.1 | .0686 | 12.81 | .0138 | 5.900 | .0 |
| 23 | 6.9 | .0638 | 12.59 | .0121 | 5.767 | .0 |
| 24 | 6.7 | .0595 | 12.37 | .0106 | 5.633 | .0 |
| 25 | 6.4 | .0557 | 12.04 | .0093 | 5.500 | .0 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:OTHER. 5%+110% LAPSE

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 81.19 | 71.34 | 69.98 | 78.13 | 81.19 | 77.45 | 77.45 | 81.19 | 81.19 | 79.08 | 78.13 | 78.13 | 78.13 | 78.13 |
| 2 | 70.71 | 57.06 | 55.74 | 65.52 | 70.71 | 62.46 | 63.55 | 66.93 | 69.55 | 67.04 | 65.52 | 66.85 | 65.19 | 65.53 |
| 3 | 62.6 | 46.81 | 45.59 | 55.57 | 62.6 | 49.63 | 52.71 | 56.9 | 60.45 | 57.51 | 55.57 | 58.34 | 55.1 | 55.68 |
| 4 | 55.87 | 38.88 | 37.78 | 47.3 | 50.81 | 40.84 | 43.95 | 49.08 | 52.89 | 49.51 | 47.3 | 51.4 | 46.8 | 47.54 |
| 5 | 50.08 | 32.52 | 31.51 | 40.28 | 41.01 | 33.95 | 36.77 | 42.69 | 46.41 | 42.62 | 40.28 | 45.5 | 39.82 | 40.65 |
| 6 | 45 | 27.32 | 26.38 | 34.27 | 32.77 | 28.37 | 30.81 | 37.33 | 40.77 | 36.64 | 34.27 | 40.4 | 33.89 | 34.76 |
| 7 | 40.5 | 23.02 | 22.14 | 29.13 | 27.58 | 23.79 | 25.87 | 32.78 | 35.84 | 31.45 | 29.13 | 35.94 | 28.83 | 29.71 |
| 8 | 36.47 | 19.44 | 18.61 | 24.73 | 23.11 | 19.98 | 21.74 | 28.85 | 31.49 | 26.93 | 24.73 | 31.99 | 24.5 | 25.36 |
| 9 | 32.85 | 16.44 | 15.66 | 20.97 | 19.26 | 16.8 | 18.27 | 25.44 | 27.65 | 23.01 | 20.97 | 28.49 | 20.79 | 21.61 |
| 10 | 29.57 | 13.91 | 13.14 | 17.71 | 16.25 | 14.11 | 15.35 | 22.46 | 24.24 | 19.57 | 17.71 | 25.35 | 17.6 | 18.36 |
| 11 | 26.6 | 11.79 | 11.05 | 14.96 | 13.65 | 11.85 | 12.89 | 19.84 | 21.24 | 16.64 | 14.96 | 22.55 | 14.88 | 15.58 |
| 12 | 23.88 | 9.99 | 9.27 | 12.59 | 11.38 | 9.93 | 10.8 | 17.51 | 18.56 | 14.08 | 12.59 | 20.01 | 12.54 | 13.17 |
| 13 | 21.36 | 8.45 | 7.75 | 10.56 | 9.55 | 8.31 | 9.03 | 15.42 | 16.17 | 11.86 | 10.56 | 17.7 | 10.51 | 11.08 |
| 14 | 19.02 | 7.13 | 6.46 | 8.82 | 7.94 | 6.91 | 7.51 | 13.53 | 14.02 | 9.94 | 8.82 | 15.58 | 8.76 | 9.26 |
| 15 | 16.84 | 5.99 | 5.35 | 7.32 | 6.54 | 5.73 | 6.22 | 11.81 | 12.09 | 8.27 | 7.32 | 13.63 | 7.24 | 7.68 |
| 16 | 14.79 | 5.01 | 4.4 | 6.03 | 5.39 | 4.71 | 5.11 | 10.25 | 10.35 | 6.83 | 6.03 | 11.83 | 5.93 | 6.31 |
| 17 | 12.86 | 4.15 | 3.58 | 4.91 | 4.39 | 3.83 | 4.15 | 8.8 | 8.77 | 5.58 | 4.91 | 10.16 | 4.79 | 5.12 |
| 18 | 11.03 | 3.4 | 2.88 | 3.95 | 3.5 | 3.08 | 3.33 | 7.46 | 7.34 | 4.49 | 3.95 | 8.6 | 3.8 | 4.08 |
| 19 | 9.28 | 2.74 | 2.27 | 3.11 | 2.77 | 2.43 | 2.63 | 6.22 | 6.04 | 3.55 | 3.11 | 7.14 | 2.95 | 3.18 |
| 20 | 7.62 | 2.16 | 1.75 | 2.4 | 2.13 | 1.87 | 2.02 | 5.06 | 4.85 | 2.73 | 2.4 | 5.77 | 2.22 | 2.4 |
| 21 | 6.02 | 1.64 | 1.29 | 1.78 | 1.57 | 1.38 | 1.49 | 3.96 | 3.75 | 2.03 | 1.78 | 4.48 | 1.6 | 1.74 |
| 22 | 4.46 | 1.17 | .9 | 1.24 | 1.09 | .96 | 1.04 | 2.91 | 2.72 | 1.41 | 1.24 | 3.26 | 1.06 | 1.17 |
| 23 | 2.94 | .74 | .56 | .77 | .68 | .59 | .64 | 1.9 | 1.76 | .87 | .77 | 2.1 | .62 | .69 |
| 24 | 1.46 | .36 | .26 | .36 | .31 | .28 | .3 | .94 | .86 | .41 | .36 | 1 | .26 | .3 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 113.81 | 100 | 98.09 | 109.51 | 113.81 | 108.57 | 108.57 | 113.81 | 113.81 | 110.84 | 109.51 | 109.51 | 109.51 | 109.51 |
| 2 | 123.92 | 100 | 97.69 | 114.84 | 123.92 | 109.47 | 111.37 | 117.31 | 121.9 | 117.5 | 114.84 | 117.17 | 114.25 | 114.85 |
| 3 | 133.74 | 100 | 97.41 | 118.72 | 133.74 | 106.03 | 112.6 | 121.56 | 129.15 | 122.86 | 118.72 | 124.64 | 117.71 | 118.95 |
| 4 | 143.69 | 100 | 97.16 | 121.66 | 130.68 | 105.03 | 113.04 | 126.23 | 136.03 | 127.32 | 121.66 | 132.18 | 120.37 | 122.27 |
| 5 | 153.99 | 100 | 96.89 | 123.86 | 126.1 | 104.39 | 113.06 | 131.27 | 142.71 | 131.06 | 123.86 | 139.92 | 122.46 | 125.01 |
| 6 | 164.72 | 100 | 96.55 | 125.44 | 119.97 | 103.86 | 112.81 | 136.66 | 149.25 | 134.13 | 125.44 | 147.89 | 124.06 | 127.25 |
| 7 | 175.9 | 100 | 96.18 | 126.54 | 119.78 | 103.32 | 112.37 | 142.37 | 155.67 | 136.6 | 126.54 | 156.1 | 125.24 | 129.04 |
| 8 | 187.6 | 100 | 95.73 | 127.2 | 118.85 | 102.76 | 111.8 | 148.4 | 161.98 | 138.52 | 127.2 | 164.57 | 126.03 | 130.42 |
| 9 | 199.81 | 100 | 95.24 | 127.52 | 117.12 | 102.15 | 111.13 | 154.75 | 168.17 | 139.96 | 127.52 | 173.3 | 126.47 | 131.42 |
| 10 | 212.57 | 100 | 94.5 | 127.31 | 116.84 | 101.43 | 110.32 | 161.44 | 174.24 | 140.72 | 127.31 | 182.22 | 126.53 | 132 |
| 11 | 225.6 | 100 | 93.71 | 126.85 | 115.77 | 100.51 | 109.29 | 168.25 | 180.11 | 141.07 | 126.85 | 191.22 | 126.2 | 132.14 |
| 12 | 239.01 | 100 | 92.79 | 126.08 | 113.93 | 99.44 | 108.13 | 175.27 | 185.82 | 140.93 | 126.08 | 200.3 | 125.49 | 131.85 |
| 13 | 252.75 | 100 | 91.75 | 125.01 | 113.03 | 98.29 | 106.81 | 182.45 | 191.34 | 140.37 | 125.01 | 209.42 | 124.38 | 131.12 |
| 14 | 266.76 | 100 | 90.57 | 123.69 | 111.43 | 96.99 | 105.34 | 189.76 | 196.67 | 139.4 | 123.69 | 218.49 | 122.84 | 129.92 |
| 15 | 280.98 | 100 | 89.27 | 122.12 | 109.09 | 95.55 | 103.73 | 197.17 | 201.8 | 138.06 | 122.12 | 227.47 | 120.85 | 128.24 |
| 16 | 295.37 | 100 | 87.86 | 120.35 | 107.73 | 93.99 | 101.98 | 204.64 | 206.74 | 136.4 | 120.35 | 236.27 | 118.4 | 126.05 |
| 17 | 309.9 | 100 | 86.3 | 118.34 | 105.74 | 92.31 | 100.1 | 212.16 | 211.47 | 134.4 | 118.34 | 244.82 | 115.45 | 123.31 |
| 18 | 324.45 | 100 | 84.62 | 116.13 | 103.08 | 90.49 | 98.07 | 219.67 | 216.03 | 132.11 | 116.13 | 252.99 | 111.95 | 120 |
| 19 | 338.96 | 100 | 82.82 | 113.71 | 101.26 | 88.54 | 95.91 | 227.11 | 220.44 | 129.53 | 113.71 | 260.65 | 107.84 | 116.06 |
| 20 | 353.3 | 100 | 80.94 | 111.18 | 98.85 | 86.47 | 93.63 | 234.43 | 224.75 | 126.77 | 111.18 | 267.64 | 103.08 | 111.43 |
| 21 | 367.47 | 100 | 79 | 108.54 | 95.85 | 84.32 | 91.26 | 241.61 | 228.95 | 123.85 | 108.54 | 273.78 | 97.55 | 106.02 |
| 22 | 381.51 | 100 | 76.98 | 105.78 | 93.68 | 82.13 | 88.82 | 248.7 | 232.97 | 120.76 | 105.78 | 278.76 | 91.06 | 99.69 |
| 23 | 395.34 | 100 | 74.89 | 102.93 | 91.03 | 79.88 | 86.32 | 255.63 | 236.86 | 117.53 | 102.93 | 281.96 | 83.3 | 92.19 |
| 24 | 408.93 | 100 | 72.76 | 100 | 87.91 | 77.58 | 83.78 | 262.4 | 240.63 | 114.21 | 100 | 281.96 | 73.45 | 83.01 |
| 25 | 72 | 100 | 12.04 | 100 | 14.59 | 12.83 | 13.85 | 45.87 | 76.52 | 72 | 72 | 49.64 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:OTHER. 5%+110% LAPSE

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 18.81 | 28.66 | 30.02 | 21.87 | 18.81 | 22.55 | 22.55 | 18.81 | 18.81 | 20.92 | 21.87 | 21.87 | 21.87 | 21.87 |
| 2 | 10.49 | 14.28 | 14.24 | 12.61 | 10.49 | 14.99 | 13.91 | 14.26 | 11.64 | 12.03 | 12.61 | 11.28 | 12.94 | 12.6 |
| 3 | 8.11 | 10.25 | 10.14 | 9.95 | 8.11 | 12.83 | 10.84 | 10.03 | 9.1 | 9.53 | 9.95 | 8.51 | 10.09 | 9.85 |
| 4 | 6.73 | 7.93 | 7.82 | 8.27 | 11.79 | 8.79 | 8.75 | 7.82 | 7.56 | 8 | 8.27 | 6.94 | 8.29 | 8.14 |
| 5 | 5.79 | 6.36 | 6.27 | 7.03 | 9.8 | 6.89 | 7.19 | 6.39 | 6.48 | 6.89 | 7.03 | 5.9 | 6.98 | 6.89 |
| 6 | 5.08 | 5.2 | 5.13 | 6.01 | 8.24 | 5.58 | 5.95 | 5.36 | 5.64 | 5.98 | 6.01 | 5.1 | 5.93 | 5.89 |
| 7 | 4.5 | 4.29 | 4.23 | 5.14 | 5.2 | 4.58 | 4.94 | 4.55 | 4.93 | 5.19 | 5.14 | 4.46 | 5.06 | 5.05 |
| 8 | 4.03 | 3.58 | 3.53 | 4.4 | 4.47 | 3.81 | 4.13 | 3.92 | 4.35 | 4.52 | 4.4 | 3.94 | 4.33 | 4.35 |
| 9 | 3.62 | 3 | 2.95 | 3.76 | 3.85 | 3.18 | 3.46 | 3.41 | 3.84 | 3.92 | 3.76 | 3.5 | 3.71 | 3.75 |
| 10 | 3.28 | 2.53 | 2.51 | 3.26 | 3 | 2.69 | 2.93 | 2.99 | 3.41 | 3.44 | 3.26 | 3.14 | 3.19 | 3.25 |
| 11 | 2.96 | 2.12 | 2.09 | 2.75 | 2.6 | 2.26 | 2.46 | 2.61 | 3 | 2.94 | 2.75 | 2.8 | 2.72 | 2.78 |
| 12 | 2.73 | 1.8 | 1.78 | 2.37 | 2.27 | 1.92 | 2.09 | 2.33 | 2.68 | 2.56 | 2.37 | 2.54 | 2.35 | 2.41 |
| 13 | 2.52 | 1.54 | 1.52 | 2.03 | 1.83 | 1.63 | 1.78 | 2.09 | 2.39 | 2.22 | 2.03 | 2.31 | 2.03 | 2.09 |
| 14 | 2.34 | 1.32 | 1.3 | 1.75 | 1.61 | 1.39 | 1.51 | 1.89 | 2.15 | 1.92 | 1.75 | 2.12 | 1.75 | 1.82 |
| 15 | 2.18 | 1.14 | 1.11 | 1.5 | 1.41 | 1.19 | 1.29 | 1.71 | 1.93 | 1.67 | 1.5 | 1.95 | 1.52 | 1.58 |
| 16 | 2.05 | .98 | .95 | 1.29 | 1.14 | 1.02 | 1.11 | 1.57 | 1.74 | 1.44 | 1.29 | 1.8 | 1.31 | 1.37 |
| 17 | 1.93 | .86 | .82 | 1.12 | 1.01 | .88 | .95 | 1.45 | 1.58 | 1.25 | 1.12 | 1.67 | 1.14 | 1.2 |
| 18 | 1.83 | .75 | .7 | .96 | .88 | .75 | .82 | 1.34 | 1.43 | 1.09 | .96 | 1.56 | .98 | 1.04 |
| 19 | 1.74 | .66 | .61 | .83 | .73 | .65 | .71 | 1.24 | 1.3 | .94 | .83 | 1.46 | .85 | .9 |
| 20 | 1.66 | .58 | .52 | .72 | .64 | .56 | .61 | 1.16 | 1.19 | .81 | .72 | 1.37 | .73 | .78 |
| 21 | 1.6 | .52 | .45 | .62 | .56 | .48 | .53 | 1.1 | 1.1 | .71 | .62 | 1.29 | .63 | .67 |
| 22 | 1.56 | .47 | .39 | .54 | .47 | .42 | .46 | 1.05 | 1.03 | .62 | .54 | 1.22 | .53 | .57 |
| 23 | 1.52 | .42 | .34 | .47 | .42 | .37 | .4 | 1 | .96 | .54 | .47 | 1.16 | .44 | .48 |
| 24 | 1.48 | .39 | .3 | .41 | .36 | .32 | .34 | .97 | .9 | .47 | .41 | 1.09 | .36 | .39 |
| 25 | 1.46 | .36 | .26 | .36 | .31 | .28 | .3 | .94 | .86 | .41 | .36 | 1 | .26 | .3 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 65.63 | 100 | 104.75 | 76.32 | 65.63 | 78.67 | 78.67 | 65.63 | 65.63 | 73.01 | 76.32 | 76.32 | 76.32 | 76.32 |
| 2 | 73.4 | 100 | 99.71 | 88.25 | 73.4 | 104.96 | 97.36 | 99.82 | 81.47 | 84.25 | 88.25 | 78.94 | 90.58 | 88.21 |
| 3 | 79.09 | 100 | 98.97 | 97.09 | 79.09 | 125.19 | 105.78 | 97.91 | 88.79 | 93.03 | 97.09 | 83.05 | 98.47 | 96.11 |
| 4 | 84.91 | 100 | 98.61 | 104.32 | 148.74 | 110.96 | 110.44 | 98.65 | 95.42 | 100.94 | 104.32 | 87.62 | 104.63 | 102.65 |
| 5 | 91.06 | 100 | 98.55 | 110.41 | 154.08 | 108.3 | 112.96 | 100.45 | 101.88 | 108.24 | 110.41 | 92.65 | 109.72 | 108.29 |
| 6 | 97.66 | 100 | 98.64 | 115.54 | 158.29 | 107.19 | 114.37 | 102.97 | 108.35 | 114.96 | 115.54 | 98.09 | 114.05 | 113.25 |
| 7 | 104.76 | 100 | 98.56 | 119.58 | 120.98 | 106.72 | 115.14 | 106.06 | 114.84 | 120.85 | 119.58 | 103.87 | 117.75 | 117.64 |
| 8 | 112.41 | 100 | 98.59 | 122.94 | 124.81 | 106.38 | 115.44 | 109.6 | 121.42 | 126.16 | 122.94 | 110.11 | 120.92 | 121.54 |
| 9 | 120.69 | 100 | 98.43 | 125.43 | 128.35 | 106.08 | 115.48 | 113.6 | 128.07 | 130.64 | 125.43 | 116.74 | 123.62 | 124.97 |
| 10 | 129.66 | 100 | 99.34 | 128.69 | 118.64 | 106.09 | 115.6 | 118.03 | 134.84 | 135.79 | 128.69 | 124.23 | 126.14 | 128.22 |
| 11 | 140 | 100 | 98.86 | 129.86 | 122.82 | 106.57 | 116.06 | 123.49 | 141.5 | 138.82 | 129.86 | 132.12 | 128.34 | 131.21 |
| 12 | 151.29 | 100 | 98.8 | 131.16 | 125.96 | 106.43 | 115.76 | 129.37 | 148.52 | 141.8 | 131.16 | 140.9 | 130.15 | 133.73 |
| 13 | 163.63 | 100 | 98.54 | 131.9 | 118.89 | 105.78 | 115.35 | 135.86 | 155.53 | 144.04 | 131.9 | 150.31 | 131.62 | 135.88 |
| 14 | 177.12 | 100 | 98.09 | 132.17 | 121.66 | 105.3 | 114.72 | 142.97 | 162.57 | 145.6 | 132.17 | 160.41 | 132.68 | 137.59 |
| 15 | 191.82 | 100 | 97.44 | 131.95 | 123.76 | 104.54 | 113.84 | 150.74 | 169.62 | 146.46 | 131.95 | 171.22 | 133.29 | 138.79 |
| 16 | 207.83 | 100 | 96.44 | 131.13 | 116 | 103.49 | 112.63 | 159.19 | 176.69 | 146.48 | 131.13 | 182.71 | 133.31 | 139.37 |
| 17 | 225.17 | 100 | 95.37 | 130.06 | 117.33 | 102.12 | 111.07 | 168.3 | 183.86 | 146.07 | 130.06 | 194.96 | 132.69 | 139.25 |
| 18 | 243.97 | 100 | 93.89 | 128.34 | 117.8 | 100.54 | 109.26 | 178.17 | 190.82 | 144.78 | 128.34 | 207.8 | 131.31 | 138.32 |
| 19 | 264.18 | 100 | 92.13 | 126.15 | 110.63 | 98.61 | 107.05 | 188.73 | 197.73 | 142.82 | 126.15 | 221.18 | 128.99 | 136.39 |
| 20 | 285.83 | 100 | 89.78 | 123.11 | 110.21 | 96.21 | 104.38 | 200.01 | 204.46 | 139.77 | 123.11 | 234.75 | 125.49 | 133.22 |
| 21 | 308.63 | 100 | 87.06 | 119.49 | 108.3 | 93.23 | 101.1 | 211.78 | 211.53 | 135.97 | 119.49 | 248.27 | 120.51 | 128.46 |
| 22 | 332.45 | 100 | 84.05 | 115.43 | 101.25 | 89.79 | 97.33 | 223.95 | 218.91 | 131.56 | 115.43 | 261.36 | 113.73 | 121.81 |
| 23 | 357.28 | 100 | 80.63 | 110.78 | 98.31 | 86.08 | 93.19 | 236.54 | 226.15 | 126.41 | 110.78 | 273.16 | 104.66 | 112.83 |
| 24 | 382.86 | 100 | 76.85 | 105.62 | 93.9 | 82 | 88.66 | 249.41 | 233.39 | 120.6 | 105.62 | 281.96 | 92.36 | 100.63 |
| 25 | 408.93 | 100 | 72.76 | 100 | 87.91 | 77.58 | 83.78 | 262.4 | 240.63 | 114.21 | 100 | 281.96 | 73.45 | 83.01 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:COMMS. 5%+110% LAPSE

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 70.88 | 59.9 | 61.09 | 68.21 | 70.88 | 67.62 | 67.62 | 70.88 | 70.88 | 69.04 | 68.21 | 67.82 | 67.82 | 68.21 |
| 2 | 77.76 | 59.77 | 61.29 | 70.51 | 77.76 | 68.69 | 69.88 | 73.61 | 75.8 | 73.73 | 72.06 | 73.37 | 71.99 | 72.06 |
| 3 | 74.89 | 52.98 | 54.54 | 64.36 | 74.89 | 59.37 | 63.05 | 68.07 | 70.91 | 68.8 | 66.48 | 69.73 | 66.4 | 66.61 |
| 4 | 72.24 | 47.46 | 48.85 | 58.54 | 65.7 | 52.8 | 56.83 | 63.46 | 66.27 | 64.01 | 61.17 | 66.46 | 61.12 | 61.47 |
| 5 | 69.7 | 42.81 | 43.85 | 53.03 | 57.07 | 47.25 | 51.17 | 59.41 | 61.83 | 59.32 | 56.06 | 63.39 | 56.1 | 56.58 |
| 6 | 62.63 | 35.96 | 36.71 | 45.11 | 45.61 | 39.49 | 42.89 | 51.96 | 53.84 | 50.99 | 47.69 | 56.28 | 47.65 | 48.38 |
| 7 | 56.36 | 30.31 | 30.82 | 38.35 | 38.38 | 33.11 | 36.01 | 45.62 | 46.92 | 43.77 | 40.55 | 50.07 | 40.47 | 41.35 |
| 8 | 50.76 | 25.59 | 25.9 | 32.56 | 32.16 | 27.81 | 30.25 | 40.16 | 40.85 | 37.48 | 34.42 | 44.57 | 34.35 | 35.29 |
| 9 | 45.72 | 21.65 | 21.79 | 27.6 | 26.8 | 23.38 | 25.43 | 35.41 | 35.53 | 32.03 | 29.18 | 39.69 | 29.12 | 30.07 |
| 10 | 41.15 | 18.31 | 18.29 | 23.31 | 22.62 | 19.64 | 21.36 | 31.26 | 30.84 | 27.24 | 24.65 | 35.31 | 24.62 | 25.56 |
| 11 | 37.03 | 15.53 | 15.38 | 19.69 | 19 | 16.5 | 17.94 | 27.62 | 26.76 | 23.15 | 20.82 | 31.42 | 20.81 | 21.69 |
| 12 | 33.23 | 13.15 | 12.9 | 16.58 | 15.84 | 13.83 | 15.03 | 24.37 | 23.15 | 19.6 | 17.53 | 27.88 | 17.51 | 18.33 |
| 13 | 29.73 | 11.12 | 10.79 | 13.91 | 13.29 | 11.56 | 12.56 | 21.46 | 19.95 | 16.51 | 14.7 | 24.65 | 14.67 | 15.42 |
| 14 | 26.47 | 9.39 | 8.99 | 11.61 | 11.06 | 9.62 | 10.45 | 18.83 | 17.12 | 13.83 | 12.27 | 21.7 | 12.22 | 12.89 |
| 15 | 23.43 | 7.89 | 7.44 | 9.63 | 9.1 | 7.97 | 8.65 | 16.44 | 14.6 | 11.51 | 10.18 | 18.99 | 10.1 | 10.69 |
| 16 | 20.58 | 6.59 | 6.12 | 7.93 | 7.51 | 6.55 | 7.11 | 14.26 | 12.37 | 9.51 | 8.39 | 16.48 | 8.27 | 8.78 |
| 17 | 17.89 | 5.46 | 4.98 | 6.46 | 6.11 | 5.33 | 5.78 | 12.25 | 10.36 | 7.76 | 6.83 | 14.15 | 6.68 | 7.12 |
| 18 | 15.35 | 4.47 | 4 | 5.2 | 4.88 | 4.28 | 4.64 | 10.39 | 8.58 | 6.25 | 5.49 | 11.98 | 5.3 | 5.68 |
| 19 | 12.92 | 3.61 | 3.16 | 4.1 | 3.86 | 3.38 | 3.66 | 8.66 | 6.98 | 4.94 | 4.33 | 9.95 | 4.12 | 4.42 |
| 20 | 10.61 | 2.84 | 2.43 | 3.16 | 2.97 | 2.6 | 2.81 | 7.04 | 5.54 | 3.81 | 3.34 | 8.04 | 3.1 | 3.35 |
| 21 | 8.37 | 2.16 | 1.8 | 2.34 | 2.18 | 1.92 | 2.08 | 5.51 | 4.24 | 2.82 | 2.47 | 6.25 | 2.22 | 2.42 |
| 22 | 6.21 | 1.54 | 1.25 | 1.63 | 1.52 | 1.34 | 1.44 | 4.05 | 3.05 | 1.96 | 1.72 | 4.54 | 1.48 | 1.62 |
| 23 | 4.09 | .98 | .78 | 1.01 | .94 | .83 | .89 | 2.65 | 1.96 | 1.22 | 1.07 | 2.92 | .86 | .95 |
| 24 | 2.03 | .47 | .36 | .47 | .44 | .38 | .42 | 1.3 | .94 | .57 | .5 | 1.4 | .36 | .41 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 118.34 | 100 | 102 | 113.88 | 118.34 | 112.9 | 112.9 | 118.34 | 118.34 | 115.26 | 113.88 | 113.23 | 113.23 | 113.88 |
| 2 | 130.1 | 100 | 102.56 | 117.97 | 130.1 | 114.93 | 116.93 | 123.16 | 126.83 | 123.36 | 120.56 | 122.76 | 120.46 | 120.58 |
| 3 | 141.36 | 100 | 102.96 | 121.5 | 141.36 | 112.08 | 119.02 | 128.49 | 133.85 | 129.86 | 125.49 | 131.63 | 125.34 | 125.73 |
| 4 | 152.23 | 100 | 102.93 | 123.36 | 138.45 | 111.27 | 119.76 | 133.73 | 139.64 | 134.89 | 128.89 | 140.05 | 128.8 | 129.54 |
| 5 | 162.8 | 100 | 102.43 | 123.86 | 133.32 | 110.36 | 119.53 | 138.78 | 144.41 | 138.56 | 130.95 | 148.07 | 131.05 | 132.16 |
| 6 | 174.14 | 100 | 102.08 | 125.44 | 126.83 | 109.8 | 119.26 | 144.48 | 149.73 | 141.8 | 132.62 | 156.5 | 132.5 | 134.53 |
| 7 | 185.97 | 100 | 101.68 | 126.54 | 126.63 | 109.23 | 118.8 | 150.51 | 154.79 | 144.42 | 133.78 | 165.19 | 133.54 | 136.42 |
| 8 | 198.33 | 100 | 101.21 | 127.2 | 125.65 | 108.64 | 118.2 | 156.89 | 159.61 | 146.45 | 134.48 | 174.15 | 134.21 | 137.88 |
| 9 | 211.24 | 100 | 100.69 | 127.52 | 123.82 | 108 | 117.49 | 163.61 | 164.15 | 147.97 | 134.82 | 183.39 | 134.52 | 138.94 |
| 10 | 224.73 | 100 | 99.9 | 127.31 | 123.53 | 107.24 | 116.63 | 170.68 | 168.4 | 148.78 | 134.6 | 192.84 | 134.46 | 139.55 |
| 11 | 238.51 | 100 | 99.07 | 126.85 | 122.4 | 106.26 | 115.55 | 177.88 | 172.37 | 149.14 | 134.11 | 202.36 | 134.01 | 139.7 |
| 12 | 252.69 | 100 | 98.1 | 126.08 | 120.45 | 105.13 | 114.31 | 185.3 | 176.02 | 149 | 133.29 | 211.97 | 133.16 | 139.4 |
| 13 | 267.21 | 100 | 97 | 125.01 | 119.5 | 103.91 | 112.92 | 192.89 | 179.36 | 148.4 | 132.17 | 221.61 | 131.9 | 138.62 |
| 14 | 282.02 | 100 | 95.75 | 123.69 | 117.8 | 102.54 | 111.37 | 200.62 | 182.39 | 147.38 | 130.77 | 231.22 | 130.21 | 137.35 |
| 15 | 297.06 | 100 | 94.37 | 122.12 | 115.33 | 101.02 | 109.66 | 208.45 | 185.13 | 145.96 | 129.11 | 240.71 | 128.05 | 135.57 |
| 16 | 312.27 | 100 | 92.88 | 120.35 | 113.89 | 99.37 | 107.81 | 216.35 | 187.59 | 144.21 | 127.23 | 250.03 | 125.41 | 133.26 |
| 17 | 327.63 | 100 | 91.24 | 118.34 | 111.79 | 97.59 | 105.82 | 224.3 | 189.76 | 142.09 | 125.11 | 259.08 | 122.23 | 130.37 |
| 18 | 343.02 | 100 | 89.47 | 116.13 | 108.98 | 95.67 | 103.69 | 232.24 | 191.71 | 139.67 | 122.77 | 267.73 | 118.49 | 126.87 |
| 19 | 358.36 | 100 | 87.56 | 113.71 | 107.05 | 93.61 | 101.4 | 240.11 | 193.48 | 136.94 | 120.22 | 275.83 | 114.12 | 122.7 |
| 20 | 373.51 | 100 | 85.57 | 111.18 | 104.5 | 91.42 | 98.98 | 247.84 | 195.2 | 134.02 | 117.54 | 283.22 | 109.06 | 117.8 |
| 21 | 388.5 | 100 | 83.52 | 108.54 | 101.33 | 89.15 | 96.48 | 255.44 | 196.83 | 130.94 | 114.75 | 289.73 | 103.18 | 112.09 |
| 22 | 403.34 | 100 | 81.38 | 105.78 | 99.04 | 86.83 | 93.9 | 262.93 | 198.28 | 127.67 | 111.84 | 295 | 96.3 | 105.4 |
| 23 | 417.97 | 100 | 79.18 | 102.93 | 96.24 | 84.45 | 91.26 | 270.26 | 199.63 | 124.26 | 108.82 | 298.38 | 88.08 | 97.47 |
| 24 | 432.33 | 100 | 76.92 | 100 | 92.94 | 82.02 | 88.57 | 277.42 | 200.9 | 120.74 | 105.72 | 298.38 | 77.65 | 87.75 |
| 25 | 72.22 | 100 | 12.08 | 100 | 14.63 | 12.87 | 13.89 | 46.01 | 76.09 | 72.22 | 72.22 | 49.85 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:COMMS. 5%+110% LAPSE

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 29.12 | 40.1 | 38.91 | 31.79 | 29.12 | 32.38 | 32.38 | 29.12 | 29.12 | 30.96 | 31.79 | 32.18 | 32.18 | 31.79 |
| 2 | -6.87 | .13 | -.2 | -2.3 | -6.87 | -1.07 | -2.26 | -2.72 | -4.92 | -4.69 | -3.85 | -5.55 | -4.18 | -3.86 |
| 3 | 2.87 | 6.79 | 6.75 | 6.14 | 2.87 | 9.32 | 6.83 | 5.54 | 4.89 | 4.93 | 5.58 | 3.64 | 5.6 | 5.46 |
| 4 | 2.65 | 5.52 | 5.7 | 5.82 | 9.19 | 6.57 | 6.22 | 4.61 | 4.64 | 4.78 | 5.31 | 3.27 | 5.27 | 5.13 |
| 5 | 2.54 | 4.64 | 5 | 5.52 | 8.63 | 5.56 | 5.66 | 4.05 | 4.44 | 4.69 | 5.1 | 3.07 | 5.02 | 4.89 |
| 6 | 7.07 | 6.85 | 7.14 | 7.91 | 11.46 | 7.76 | 8.28 | 7.46 | 7.98 | 8.32 | 8.37 | 7.11 | 8.45 | 8.2 |
| 7 | 6.26 | 5.65 | 5.89 | 6.76 | 7.23 | 6.38 | 6.88 | 6.34 | 6.93 | 7.22 | 7.15 | 6.21 | 7.18 | 7.03 |
| 8 | 5.6 | 4.71 | 4.91 | 5.8 | 6.22 | 5.3 | 5.75 | 5.46 | 6.06 | 6.29 | 6.13 | 5.49 | 6.12 | 6.06 |
| 9 | 5.04 | 3.95 | 4.11 | 4.95 | 5.36 | 4.43 | 4.82 | 4.74 | 5.32 | 5.45 | 5.24 | 4.88 | 5.23 | 5.22 |
| 10 | 4.57 | 3.33 | 3.5 | 4.29 | 4.18 | 3.74 | 4.07 | 4.16 | 4.69 | 4.78 | 4.53 | 4.38 | 4.49 | 4.52 |
| 11 | 4.13 | 2.79 | 2.91 | 3.62 | 3.62 | 3.14 | 3.42 | 3.64 | 4.08 | 4.09 | 3.83 | 3.9 | 3.82 | 3.87 |
| 12 | 3.8 | 2.37 | 2.48 | 3.11 | 3.16 | 2.67 | 2.91 | 3.25 | 3.61 | 3.56 | 3.29 | 3.54 | 3.29 | 3.36 |
| 13 | 3.51 | 2.03 | 2.11 | 2.67 | 2.55 | 2.27 | 2.47 | 2.91 | 3.2 | 3.09 | 2.83 | 3.22 | 2.84 | 2.91 |
| 14 | 3.26 | 1.74 | 1.8 | 2.3 | 2.24 | 1.94 | 2.11 | 2.63 | 2.83 | 2.68 | 2.43 | 2.95 | 2.45 | 2.53 |
| 15 | 3.04 | 1.5 | 1.54 | 1.98 | 1.96 | 1.66 | 1.8 | 2.39 | 2.52 | 2.32 | 2.09 | 2.71 | 2.12 | 2.2 |
| 16 | 2.85 | 1.3 | 1.32 | 1.7 | 1.59 | 1.42 | 1.54 | 2.18 | 2.24 | 2.01 | 1.8 | 2.51 | 1.83 | 1.91 |
| 17 | 2.69 | 1.13 | 1.14 | 1.47 | 1.4 | 1.22 | 1.33 | 2.01 | 2 | 1.75 | 1.55 | 2.33 | 1.59 | 1.66 |
| 18 | 2.55 | .99 | .98 | 1.27 | 1.23 | 1.05 | 1.14 | 1.86 | 1.79 | 1.51 | 1.34 | 2.17 | 1.37 | 1.44 |
| 19 | 2.42 | .87 | .85 | 1.09 | 1.02 | .9 | .98 | 1.73 | 1.6 | 1.31 | 1.16 | 2.03 | 1.19 | 1.25 |
| 20 | 2.32 | .77 | .73 | .94 | .89 | .78 | .85 | 1.62 | 1.43 | 1.13 | 1 | 1.9 | 1.02 | 1.08 |
| 21 | 2.23 | .68 | .63 | .82 | .78 | .67 | .73 | 1.53 | 1.3 | .98 | .86 | 1.8 | .87 | .93 |
| 22 | 2.17 | .62 | .55 | .71 | .66 | .59 | .63 | 1.46 | 1.19 | .86 | .75 | 1.71 | .74 | .79 |
| 23 | 2.11 | .56 | .48 | .62 | .58 | .51 | .55 | 1.4 | 1.1 | .75 | .65 | 1.62 | .62 | .67 |
| 24 | 2.07 | .51 | .41 | .54 | .51 | .44 | .48 | 1.35 | 1.01 | .65 | .57 | 1.52 | .5 | .54 |
| 25 | 2.03 | .47 | .36 | .47 | .44 | .38 | .42 | 1.3 | .94 | .57 | .5 | 1.4 | .36 | .41 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 72.6 | 100 | 97.01 | 79.27 | 72.6 | 80.74 | 80.74 | 72.6 | 72.6 | 77.21 | 79.27 | 80.24 | 80.24 | 79.27 |
| 2 | -999.99 | 100 | -153.99 | -999.99 | -999.99 | -821.07 | -999.99 | -999.99 | -999.99 | -999.99 | -999.99 | -999.99 | -999.99 | -999.99 |
| 3 | 42.25 | 100 | 99.43 | 90.45 | 42.25 | 137.19 | 100.62 | 81.59 | 72.04 | 72.63 | 82.11 | 53.56 | 82.44 | 80.35 |
| 4 | 47.93 | 100 | 103.19 | 105.48 | 166.47 | 119.04 | 112.69 | 83.44 | 84.02 | 86.64 | 96.3 | 59.21 | 95.57 | 93.02 |
| 5 | 54.79 | 100 | 107.56 | 118.78 | 185.72 | 119.64 | 121.89 | 87.14 | 95.68 | 101.09 | 109.91 | 66.13 | 108.05 | 105.35 |
| 6 | 103.25 | 100 | 104.28 | 115.54 | 167.35 | 113.32 | 120.91 | 108.86 | 116.53 | 121.54 | 122.15 | 103.8 | 123.43 | 119.73 |
| 7 | 110.75 | 100 | 104.2 | 119.58 | 127.91 | 112.83 | 121.73 | 112.13 | 122.56 | 127.76 | 126.42 | 109.92 | 126.92 | 124.38 |
| 8 | 118.85 | 100 | 104.23 | 122.94 | 131.95 | 112.47 | 122.05 | 115.87 | 128.65 | 133.38 | 129.97 | 116.52 | 129.92 | 128.49 |
| 9 | 127.6 | 100 | 104.06 | 125.43 | 135.7 | 112.15 | 122.09 | 120.1 | 134.7 | 138.11 | 132.61 | 123.54 | 132.47 | 132.12 |
| 10 | 137.08 | 100 | 105.02 | 128.69 | 125.43 | 112.16 | 122.21 | 124.78 | 140.78 | 143.56 | 136.05 | 131.47 | 134.87 | 135.56 |
| 11 | 148.01 | 100 | 104.52 | 129.86 | 129.85 | 112.67 | 122.7 | 130.55 | 146.33 | 146.76 | 137.29 | 139.81 | 136.97 | 138.72 |
| 12 | 159.95 | 100 | 104.46 | 131.16 | 133.17 | 112.52 | 122.38 | 136.77 | 152.15 | 149.92 | 138.67 | 149.1 | 138.69 | 141.38 |
| 13 | 173 | 100 | 104.18 | 131.9 | 125.69 | 111.83 | 121.95 | 143.63 | 157.68 | 152.29 | 139.45 | 159.06 | 140.08 | 143.65 |
| 14 | 187.25 | 100 | 103.71 | 132.17 | 128.62 | 111.33 | 121.29 | 151.16 | 162.97 | 153.93 | 139.73 | 169.75 | 141.06 | 145.46 |
| 15 | 202.8 | 100 | 103.01 | 131.95 | 130.84 | 110.53 | 120.35 | 159.37 | 167.96 | 154.84 | 139.5 | 181.2 | 141.57 | 146.73 |
| 16 | 219.73 | 100 | 101.96 | 131.13 | 122.64 | 109.41 | 119.07 | 168.3 | 172.64 | 154.86 | 138.63 | 193.35 | 141.49 | 147.35 |
| 17 | 238.06 | 100 | 100.83 | 130.06 | 124.05 | 107.97 | 117.43 | 177.93 | 177.12 | 154.43 | 137.51 | 206.32 | 140.73 | 147.21 |
| 18 | 257.93 | 100 | 99.26 | 128.34 | 124.54 | 106.29 | 115.51 | 188.36 | 180.93 | 153.06 | 135.69 | 219.9 | 139.18 | 146.23 |
| 19 | 279.3 | 100 | 97.4 | 126.15 | 116.96 | 104.26 | 113.18 | 199.53 | 184.33 | 150.99 | 133.37 | 234.07 | 136.66 | 144.2 |
| 20 | 302.19 | 100 | 94.92 | 123.11 | 116.52 | 101.72 | 110.36 | 211.46 | 187.11 | 147.77 | 130.15 | 248.42 | 132.89 | 140.84 |
| 21 | 326.29 | 100 | 92.04 | 119.49 | 114.5 | 98.57 | 106.88 | 223.89 | 190.08 | 143.75 | 126.32 | 262.73 | 127.56 | 135.81 |
| 22 | 351.47 | 100 | 88.86 | 115.43 | 107.05 | 94.93 | 102.9 | 236.76 | 193.22 | 139.09 | 122.03 | 276.58 | 120.35 | 128.78 |
| 23 | 377.73 | 100 | 85.24 | 110.78 | 103.94 | 91 | 98.53 | 250.08 | 195.92 | 133.64 | 117.12 | 289.06 | 110.71 | 119.29 |
| 24 | 404.77 | 100 | 81.25 | 105.62 | 99.27 | 86.7 | 93.74 | 263.68 | 198.46 | 127.5 | 111.67 | 298.38 | 97.67 | 106.39 |
| 25 | 432.33 | 100 | 76.92 | 100 | 92.94 | 82.02 | 88.57 | 277.42 | 200.9 | 120.74 | 105.72 | 298.38 | 77.65 | 87.75 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
5%+110% LAPSE
(NON-RESERVE STATISTICS HAVE BEEN MULTIPLIED BY 10)

| LOB | STATIC | FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET: FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS-ASSET | | -DIFF | 2715 | 0 | -172 | 809 | 847 | 178 | 422 | 1578 | 1876 | 1106 | 809 | 1947 | 764 | 876 |
| | | -ABS(DIFF) | 2715 | 0 | 172 | 809 | 853 | 236 | 437 | 1578 | 1876 | 1106 | 809 | 1947 | 771 | 879 |
| | | -DIFF*2 | 37282 | 0 | 149 | 5022 | 8322 | 833 | 1915 | 12827 | 19502 | 8509 | 5022 | 19599 | 4581 | 5614 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 354 | 0 | 27 | 175 | 317 | 129 | 133 | 204 | 280 | 214 | 175 | 262 | 168 | 179 |
| | | -DIFF*2 | 1354 | 0 | 19 | 542 | 1553 | 460 | 412 | 1026 | 1155 | 727 | 542 | 689 | 526 | 541 |
| COMMS-EPHS-ASSET | | -DIFF | 3901 | 0 | 36 | 1054 | 1307 | 453 | 780 | 2347 | 2293 | 1699 | 1302 | 2871 | 1274 | 1394 |
| | | -ABS(DIFF) | 3901 | 0 | 133 | 1054 | 1308 | 483 | 787 | 2347 | 2293 | 1699 | 1302 | 2871 | 1280 | 1396 |
| | | -DIFF*2 | 78200 | 0 | 120 | 8474 | 17372 | 2604 | 5607 | 28764 | 31026 | 19935 | 12640 | 43461 | 12459 | 13993 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 538 | 0 | 41 | 228 | 439 | 183 | 204 | 332 | 380 | 331 | 274 | 412 | 276 | 282 |
| | | -DIFF*2 | 2366 | 0 | 20 | 844 | 2455 | 719 | 741 | 1455 | 1706 | 1298 | 1004 | 1348 | 972 | 1008 |
| OTHER-EPHS-BENEFIT RES DIF | | | 2 | 0 | -2 | 3 | 12 | 20 | 16 | 2 | 2 | 2 | 3 | 2 | 10 | 8 |
| RESERVE INC DIF | | | 5 | 0 | -15 | 12 | 17 | 13 | 17 | 9 | 9 | 11 | 12 | 5 | 15 | 13 |
| COMMS-EPHS-BENEFIT RES DIF | | | 2 | 0 | 16 | 3 | 8 | 20 | 12 | 2 | 2 | 2 | 2 | 2 | 9 | 6 |
| RESERVE INC DIF | | | 7 | 0 | 7 | 12 | 15 | 15 | 19 | 7 | 7 | 9 | 9 | 7 | 13 | 11 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

RANK OF STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS

5%+110% LAPSE

| LOB STATIC | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS-ASSET | 1 | 6 | 7.9 | 2 | 3 | 10 | 11 | 9 | 5 | 12 | 4 | 7.1 |
| -AMORT | 1 | 5.9 | 12 | 2.9 | 2.1 | 9.8 | 11 | 9 | 6.9 | 8.2 | 4 | 5.2 |
| COMMS-EPHS-ASSET | 1 | 4 | 7.9 | 2 | 3 | 10.1 | 10.9 | 9 | 6 | 12 | 5 | 7.1 |
| -AMORT | 1 | 4 | 12 | 2 | 3 | 9.9 | 10.9 | 8 | 5.9 | 9.2 | 5.1 | 7 |

APPENDIX 2—*Continued*

INPUT FOR DYNAMIC METHOD COMPARISON TESTS
+30% DUR 10

| YEAR | TOTAL EXP. TERMINATIONS(%) | ENDING EXPECTED L(T) | TOTAL ACT. TERMINATIONS(%) | ENDING ACTUAL L(T) | INTEREST (%) | COMMISSION (%) |
|---|---|---|---|---|---|---|
| 1 | 37 | .63 | 37 | .63 | 7.500 | 55.0 |
| 2 | 19.1 | .5097 | 19.1 | .5097 | 7.500 | 20.0 |
| 3 | 14.8 | .4342 | 14.8 | .4342 | 7.500 | 10.0 |
| 4 | 12.6 | .3795 | 12.6 | .3795 | 7.500 | 9.0 |
| 5 | 11.5 | .3359 | 11.5 | .3359 | 7.500 | 8.0 |
| 6 | 10.9 | .2993 | 10.9 | .2993 | 7.500 | .0 |
| 7 | 10.3 | .2684 | 10.3 | .2684 | 7.500 | .0 |
| 8 | 10 | .2416 | 10 | .2416 | 7.500 | .0 |
| 9 | 9.6 | .2184 | 9.6 | .2184 | 7.500 | .0 |
| 10 | 10.4 | .1957 | 40.4 | .1302 | 7.500 | .0 |
| 11 | 9.4 | .1773 | 9.4 | .1179 | 7.367 | .0 |
| 12 | 9.3 | .1608 | 9.3 | .107 | 7.233 | .0 |
| 13 | 9.1 | .1462 | 9.1 | .0972 | 7.100 | .0 |
| 14 | 8.9 | .1332 | 8.9 | .0886 | 6.967 | .0 |
| 15 | 8.7 | .1216 | 8.7 | .0809 | 6.833 | .0 |
| 16 | 8.4 | .1114 | 8.4 | .0741 | 6.700 | .0 |
| 17 | 8.4 | .102 | 8.4 | .0679 | 6.567 | .0 |
| 18 | 8.2 | .0936 | 8.2 | .0623 | 6.433 | .0 |
| 19 | 8.1 | .0861 | 8.1 | .0572 | 6.300 | .0 |
| 20 | 7.6 | .0795 | 7.6 | .0529 | 6.167 | .0 |
| 21 | 7.2 | .0738 | 7.2 | .0491 | 6.033 | .0 |
| 22 | 7.1 | .0686 | 7.1 | .0456 | 5.900 | .0 |
| 23 | 6.9 | .0638 | 6.9 | .0425 | 5.767 | .0 |
| 24 | 6.7 | .0595 | 6.7 | .0396 | 5.633 | .0 |
| 25 | 6.4 | .0557 | 6.4 | .0371 | 5.500 | .0 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:OTHER. +30% DUR 10

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 81.19 | 79.86 | 81.19 | 81.19 | 81.19 | 81.19 | 81.19 | 81.19 | 81.19 | 81.19 | 81.19 | 81.19 | 81.19 | 81.19 |
| 2 | 70.71 | 68.44 | 70.71 | 70.71 | 70.71 | 70.71 | 70.71 | 70.71 | 70.71 | 70.71 | 70.71 | 70.71 | 70.71 | 70.71 |
| 3 | 62.6 | 59.49 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 |
| 4 | 55.87 | 51.95 | 55.87 | 55.87 | 55.87 | 55.87 | 55.87 | 55.87 | 55.87 | 55.87 | 55.87 | 55.87 | 55.87 | 55.87 |
| 5 | 50.08 | 45.36 | 50.08 | 50.08 | 50.08 | 50.08 | 50.08 | 50.08 | 50.08 | 50.08 | 50.08 | 50.08 | 50.08 | 50.08 |
| 6 | 45 | 39.48 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| 7 | 40.5 | 34.17 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 8 | 36.47 | 29.31 | 36.47 | 36.47 | 36.47 | 36.47 | 36.47 | 36.47 | 36.47 | 36.47 | 36.47 | 36.47 | 36.47 | 36.47 |
| 9 | 32.85 | 24.83 | 32.85 | 32.85 | 32.85 | 32.85 | 32.85 | 32.85 | 32.85 | 32.85 | 32.85 | 32.85 | 32.85 | 32.85 |
| 10 | 29.57 | 20.66 | 19.67 | 20.66 | 29.57 | 26.27 | 26.27 | 29.57 | 29.57 | 21.7 | 20.66 | 27.33 | 27.33 | 27.33 |
| 11 | 26.6 | 18.59 | 17.7 | 18.59 | 26.6 | 20.67 | 21.66 | 26.22 | 26.3 | 19.52 | 18.59 | 24.59 | 23.26 | 23.47 |
| 12 | 23.88 | 16.68 | 15.88 | 16.68 | 23.88 | 15.88 | 18.25 | 23.24 | 23.35 | 17.52 | 16.68 | 22.07 | 19.9 | 20.22 |
| 13 | 21.36 | 14.92 | 14.21 | 14.92 | 18.97 | 14.21 | 15.62 | 20.57 | 20.67 | 15.67 | 14.92 | 19.74 | 17.09 | 17.45 |
| 14 | 19.02 | 13.29 | 12.65 | 13.29 | 14.77 | 12.65 | 13.49 | 18.15 | 18.23 | 13.96 | 13.29 | 17.58 | 14.7 | 15.05 |
| 15 | 16.84 | 11.76 | 11.2 | 11.76 | 11.2 | 11.2 | 11.69 | 15.94 | 15.99 | 12.35 | 11.76 | 15.56 | 12.64 | 12.96 |
| 16 | 14.79 | 10.33 | 9.84 | 10.33 | 9.84 | 9.84 | 10.13 | 13.91 | 13.93 | 10.85 | 10.33 | 13.67 | 10.83 | 11.11 |
| 17 | 12.86 | 8.98 | 8.55 | 8.98 | 8.55 | 8.55 | 8.72 | 12.02 | 12.01 | 9.43 | 8.98 | 11.88 | 9.22 | 9.46 |
| 18 | 11.03 | 7.7 | 7.33 | 7.7 | 7.33 | 7.33 | 7.43 | 10.25 | 10.22 | 8.09 | 7.7 | 10.19 | 7.77 | 7.96 |
| 19 | 9.28 | 6.49 | 6.18 | 6.49 | 6.18 | 6.18 | 6.23 | 8.59 | 8.55 | 6.81 | 6.49 | 8.58 | 6.45 | 6.59 |
| 20 | 7.62 | 5.32 | 5.07 | 5.32 | 5.07 | 5.07 | 5.1 | 7.02 | 6.97 | 5.59 | 5.32 | 7.04 | 5.23 | 5.33 |
| 21 | 6.02 | 4.2 | 4 | 4.2 | 4 | 4 | 4.02 | 5.52 | 5.47 | 4.42 | 4.2 | 5.56 | 4.08 | 4.16 |
| 22 | 4.46 | 3.12 | 2.97 | 3.12 | 2.97 | 2.97 | 2.97 | 4.08 | 4.03 | 3.27 | 3.12 | 4.12 | 3 | 3.05 |
| 23 | 2.94 | 2.06 | 1.96 | 2.06 | 1.96 | 1.96 | 1.96 | 2.68 | 2.65 | 2.16 | 2.06 | 2.72 | 1.97 | 1.99 |
| 24 | 1.46 | 1.02 | .97 | 1.02 | .97 | .97 | .97 | 1.32 | 1.3 | 1.07 | 1.02 | 1.35 | .97 | .98 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 101.66 | 100 | 101.66 | 101.66 | 101.66 | 101.66 | 101.66 | 101.66 | 101.66 | 101.66 | 101.66 | 101.66 | 101.66 | 101.66 |
| 2 | 103.31 | 100 | 103.31 | 103.31 | 103.31 | 103.31 | 103.31 | 103.31 | 103.31 | 103.31 | 103.31 | 103.31 | 103.31 | 103.31 |
| 3 | 105.23 | 100 | 105.23 | 105.23 | 105.23 | 105.23 | 105.23 | 105.23 | 105.23 | 105.23 | 105.23 | 105.23 | 105.23 | 105.23 |
| 4 | 107.54 | 100 | 107.54 | 107.54 | 107.54 | 107.54 | 107.54 | 107.54 | 107.54 | 107.54 | 107.54 | 107.54 | 107.54 | 107.54 |
| 5 | 110.4 | 100 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 |
| 6 | 113.97 | 100 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 |
| 7 | 118.52 | 100 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 |
| 8 | 124.42 | 100 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 |
| 9 | 132.28 | 100 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 |
| 10 | 143.11 | 100 | 95.2 | 100 | 143.11 | 127.14 | 127.14 | 143.11 | 143.11 | 105.02 | 100 | 132.28 | 132.28 | 132.28 |
| 11 | 143.11 | 100 | 95.2 | 100 | 143.11 | 111.17 | 116.49 | 141.04 | 141.47 | 105.02 | 100 | 132.28 | 125.11 | 126.27 |
| 12 | 143.11 | 100 | 95.2 | 100 | 143.11 | 95.2 | 109.39 | 139.3 | 139.93 | 105.02 | 100 | 132.28 | 119.28 | 121.21 |
| 13 | 143.11 | 100 | 95.2 | 100 | 127.14 | 95.2 | 104.66 | 137.84 | 138.51 | 105.02 | 100 | 132.28 | 114.53 | 116.92 |
| 14 | 143.11 | 100 | 95.2 | 100 | 111.17 | 95.2 | 101.51 | 136.59 | 137.18 | 105.02 | 100 | 132.28 | 110.64 | 113.28 |
| 15 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 99.4 | 135.52 | 135.94 | 105.02 | 100 | 132.28 | 107.45 | 110.18 |
| 16 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 98 | 134.59 | 134.78 | 105.02 | 100 | 132.28 | 104.82 | 107.53 |
| 17 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 97.07 | 133.77 | 133.7 | 105.02 | 100 | 132.28 | 102.64 | 105.26 |
| 18 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 96.44 | 133.05 | 132.7 | 105.02 | 100 | 132.28 | 100.85 | 103.31 |
| 19 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 96.03 | 132.41 | 131.77 | 105.02 | 100 | 132.28 | 99.37 | 101.62 |
| 20 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.75 | 131.84 | 130.93 | 105.02 | 100 | 132.28 | 98.14 | 100.16 |
| 21 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.57 | 131.33 | 130.15 | 105.02 | 100 | 132.28 | 97.13 | 98.89 |
| 22 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.44 | 130.87 | 129.42 | 105.02 | 100 | 132.28 | 96.3 | 97.78 |
| 23 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.36 | 130.46 | 128.76 | 105.02 | 100 | 132.28 | 95.63 | 96.81 |
| 24 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.31 | 130.08 | 128.14 | 105.02 | 100 | 132.28 | 95.14 | 95.95 |
| 25 | 97.3 | 100 | 64.72 | 100 | 64.72 | 64.72 | 64.77 | 88.2 | 98.87 | 97.3 | 97.3 | 89.93 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:OTHER. +30% DUR 10

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 18.81 | 20.14 | 18.81 | 18.81 | 18.81 | 18.81 | 18.81 | 18.81 | 18.81 | 18.81 | 18.81 | 18.81 | 18.81 | 18.81 |
| 2 | 10.49 | 11.42 | 10.49 | 10.49 | 10.49 | 10.49 | 10.49 | 10.49 | 10.49 | 10.49 | 10.49 | 10.49 | 10.49 | 10.49 |
| 3 | 8.11 | 8.95 | 8.11 | 8.11 | 8.11 | 8.11 | 8.11 | 8.11 | 8.11 | 8.11 | 8.11 | 8.11 | 8.11 | 8.11 |
| 4 | 6.73 | 7.54 | 6.73 | 6.73 | 6.73 | 6.73 | 6.73 | 6.73 | 6.73 | 6.73 | 6.73 | 6.73 | 6.73 | 6.73 |
| 5 | 5.79 | 6.59 | 5.79 | 5.79 | 5.79 | 5.79 | 5.79 | 5.79 | 5.79 | 5.79 | 5.79 | 5.79 | 5.79 | 5.79 |
| 6 | 5.08 | 5.88 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 |
| 7 | 4.5 | 5.31 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| 8 | 4.03 | 4.86 | 4.03 | 4.03 | 4.03 | 4.03 | 4.03 | 4.03 | 4.03 | 4.03 | 4.03 | 4.03 | 4.03 | 4.03 |
| 9 | 3.62 | 4.48 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 |
| 10 | 3.28 | 4.17 | 13.18 | 12.19 | 3.28 | 6.58 | 6.58 | 3.28 | 3.28 | 11.15 | 12.19 | 5.52 | 5.52 | 5.52 |
| 11 | 2.96 | 2.07 | 1.97 | 2.07 | 2.96 | 5.6 | 4.61 | 3.35 | 3.27 | 2.17 | 2.07 | 2.74 | 4.07 | 3.86 |
| 12 | 2.73 | 1.91 | 1.81 | 1.91 | 2.73 | 4.78 | 3.41 | 2.98 | 2.95 | 2 | 1.91 | 2.52 | 3.36 | 3.25 |
| 13 | 2.52 | 1.76 | 1.68 | 1.76 | 4.9 | 1.68 | 2.63 | 2.67 | 2.68 | 1.85 | 1.76 | 2.33 | 2.81 | 2.77 |
| 14 | 2.34 | 1.63 | 1.56 | 1.63 | 4.2 | 1.56 | 2.13 | 2.42 | 2.44 | 1.72 | 1.63 | 2.16 | 2.39 | 2.39 |
| 15 | 2.18 | 1.52 | 1.45 | 1.52 | 3.57 | 1.45 | 1.8 | 2.21 | 2.24 | 1.6 | 1.52 | 2.02 | 2.06 | 2.09 |
| 16 | 2.05 | 1.43 | 1.36 | 1.43 | 1.36 | 1.36 | 1.57 | 2.03 | 2.06 | 1.5 | 1.43 | 1.89 | 1.81 | 1.85 |
| 17 | 1.93 | 1.35 | 1.29 | 1.35 | 1.29 | 1.29 | 1.41 | 1.89 | 1.92 | 1.42 | 1.35 | 1.79 | 1.61 | 1.66 |
| 18 | 1.83 | 1.28 | 1.22 | 1.28 | 1.22 | 1.22 | 1.29 | 1.77 | 1.79 | 1.34 | 1.28 | 1.69 | 1.45 | 1.5 |
| 19 | 1.74 | 1.22 | 1.16 | 1.22 | 1.16 | 1.16 | 1.2 | 1.66 | 1.68 | 1.28 | 1.22 | 1.61 | 1.32 | 1.37 |
| 20 | 1.66 | 1.16 | 1.11 | 1.16 | 1.11 | 1.11 | 1.13 | 1.57 | 1.58 | 1.22 | 1.16 | 1.54 | 1.22 | 1.26 |
| 21 | 1.6 | 1.12 | 1.07 | 1.12 | 1.07 | 1.07 | 1.08 | 1.5 | 1.5 | 1.18 | 1.12 | 1.48 | 1.14 | 1.18 |
| 22 | 1.56 | 1.09 | 1.04 | 1.09 | 1.04 | 1.04 | 1.04 | 1.44 | 1.44 | 1.14 | 1.09 | 1.44 | 1.08 | 1.11 |
| 23 | 1.52 | 1.06 | 1.01 | 1.06 | 1.01 | 1.01 | 1.01 | 1.4 | 1.39 | 1.11 | 1.06 | 1.4 | 1.03 | 1.06 |
| 24 | 1.48 | 1.04 | .99 | 1.04 | .99 | .99 | .99 | 1.36 | 1.34 | 1.09 | 1.04 | 1.37 | 1 | 1.01 |
| 25 | 1.46 | 1.02 | .97 | 1.02 | .97 | .97 | .97 | 1.32 | 1.3 | 1.07 | 1.02 | 1.35 | .97 | .98 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 93.41 | 100 | 93.41 | 93.41 | 93.41 | 93.41 | 93.41 | 93.41 | 93.41 | 93.41 | 93.41 | 93.41 | 93.41 | 93.41 |
| 2 | 91.81 | 100 | 91.81 | 91.81 | 91.81 | 91.81 | 91.81 | 91.81 | 91.81 | 91.81 | 91.81 | 91.81 | 91.81 | 91.81 |
| 3 | 90.55 | 100 | 90.55 | 90.55 | 90.55 | 90.55 | 90.55 | 90.55 | 90.55 | 90.55 | 90.55 | 90.55 | 90.55 | 90.55 |
| 4 | 89.26 | 100 | 89.26 | 89.26 | 89.26 | 89.26 | 89.26 | 89.26 | 89.26 | 89.26 | 89.26 | 89.26 | 89.26 | 89.26 |
| 5 | 87.9 | 100 | 87.9 | 87.9 | 87.9 | 87.9 | 87.9 | 87.9 | 87.9 | 87.9 | 87.9 | 87.9 | 87.9 | 87.9 |
| 6 | 86.4 | 100 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 |
| 7 | 84.73 | 100 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 |
| 8 | 82.89 | 100 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 |
| 9 | 80.85 | 100 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 |
| 10 | 78.65 | 100 | 315.87 | 292.09 | 78.65 | 157.72 | 157.72 | 78.65 | 78.65 | 267.25 | 292.09 | 132.28 | 132.28 | 132.28 |
| 11 | 143.11 | 100 | 95.2 | 100 | 143.11 | 270.52 | 222.73 | 161.77 | 157.91 | 105.02 | 100 | 132.28 | 196.62 | 186.2 |
| 12 | 143.11 | 100 | 95.2 | 100 | 143.11 | 250.94 | 178.62 | 156.2 | 154.87 | 105.02 | 100 | 132.28 | 176.13 | 170.63 |
| 13 | 143.11 | 100 | 95.2 | 100 | 278.5 | 95.2 | 149.51 | 151.7 | 152.02 | 105.02 | 100 | 132.28 | 159.58 | 157.54 |
| 14 | 143.11 | 100 | 95.2 | 100 | 257.03 | 95.2 | 130.32 | 147.99 | 149.32 | 105.02 | 100 | 132.28 | 146.16 | 146.51 |
| 15 | 143.11 | 100 | 95.2 | 100 | 234.4 | 95.2 | 117.74 | 144.88 | 146.74 | 105.02 | 100 | 132.28 | 135.28 | 137.19 |
| 16 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 109.54 | 142.26 | 144.29 | 105.02 | 100 | 132.28 | 126.45 | 129.32 |
| 17 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 104.22 | 140.02 | 141.97 | 105.02 | 100 | 132.28 | 119.27 | 122.65 |
| 18 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 100.82 | 138.11 | 139.75 | 105.02 | 100 | 132.28 | 113.45 | 117.03 |
| 19 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 98.66 | 136.45 | 137.64 | 105.02 | 100 | 132.28 | 108.75 | 112.29 |
| 20 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 97.3 | 135.01 | 135.65 | 105.02 | 100 | 132.28 | 104.97 | 108.29 |
| 21 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 96.44 | 133.75 | 133.84 | 105.02 | 100 | 132.28 | 101.93 | 104.92 |
| 22 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.92 | 132.65 | 132.22 | 105.02 | 100 | 132.28 | 99.51 | 102.07 |
| 23 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.6 | 131.68 | 130.72 | 105.02 | 100 | 132.28 | 97.59 | 99.67 |
| 24 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.41 | 130.83 | 129.36 | 105.02 | 100 | 132.28 | 96.12 | 97.65 |
| 25 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.31 | 130.08 | 128.14 | 105.02 | 100 | 132.28 | 95.14 | 95.95 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:COMMS. +30% DUR 10

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 70.88 | 69.03 | 70.88 | 70.88 | 70.88 | 70.88 | 70.88 | 70.88 | 70.88 | 70.88 | 70.88 | 70.88 | 70.88 | 70.88 |
| 2 | 77.76 | 74.61 | 77.76 | 77.76 | 77.76 | 77.76 | 77.76 | 77.76 | 77.76 | 77.76 | 77.76 | 77.76 | 77.76 | 77.76 |
| 3 | 74.89 | 70.56 | 74.89 | 74.89 | 74.89 | 74.89 | 74.89 | 74.89 | 74.89 | 74.89 | 74.89 | 74.89 | 74.89 | 74.89 |
| 4 | 72.24 | 66.79 | 72.24 | 72.24 | 72.24 | 72.24 | 72.24 | 72.24 | 72.24 | 72.24 | 72.24 | 72.24 | 72.24 | 72.24 |
| 5 | 69.7 | 63.13 | 69.7 | 69.7 | 69.7 | 69.7 | 69.7 | 69.7 | 69.7 | 69.7 | 69.7 | 69.7 | 69.7 | 69.7 |
| 6 | 62.63 | 54.95 | 62.63 | 62.63 | 62.63 | 62.63 | 62.63 | 62.63 | 62.63 | 62.63 | 62.63 | 62.63 | 62.63 | 62.63 |
| 7 | 56.36 | 47.56 | 56.36 | 56.36 | 56.36 | 56.36 | 56.36 | 56.36 | 56.36 | 56.36 | 56.36 | 56.36 | 56.36 | 56.36 |
| 8 | 50.76 | 40.8 | 50.76 | 50.76 | 50.76 | 50.76 | 50.76 | 50.76 | 50.76 | 50.76 | 50.76 | 50.76 | 50.76 | 50.76 |
| 9 | 45.72 | 34.57 | 45.72 | 45.72 | 45.72 | 45.72 | 45.72 | 45.72 | 45.72 | 45.72 | 45.72 | 45.72 | 45.72 | 45.72 |
| 10 | 41.15 | 28.76 | 27.38 | 28.76 | 41.15 | 36.56 | 36.56 | 41.15 | 41.15 | 30.2 | 28.76 | 38.04 | 38.04 | 38.04 |
| 11 | 37.03 | 25.87 | 24.63 | 25.87 | 37.03 | 28.76 | 30.14 | 36.49 | 36.44 | 27.17 | 25.87 | 34.23 | 32.37 | 32.67 |
| 12 | 33.23 | 23.22 | 22.11 | 23.22 | 33.23 | 22.11 | 25.4 | 32.35 | 32.23 | 24.39 | 23.22 | 30.72 | 27.7 | 28.14 |
| 13 | 29.73 | 20.77 | 19.77 | 20.77 | 26.41 | 19.77 | 21.74 | 28.63 | 28.43 | 21.81 | 20.77 | 27.47 | 23.79 | 24.28 |
| 14 | 26.47 | 18.5 | 17.61 | 18.5 | 20.56 | 17.61 | 18.77 | 25.26 | 24.99 | 19.42 | 18.5 | 24.47 | 20.46 | 20.95 |
| 15 | 23.43 | 16.37 | 15.59 | 16.37 | 15.59 | 15.59 | 16.28 | 22.19 | 21.86 | 17.19 | 16.37 | 21.66 | 17.59 | 18.04 |
| 16 | 20.58 | 14.38 | 13.69 | 14.38 | 13.69 | 13.69 | 14.1 | 19.36 | 18.99 | 15.1 | 14.38 | 19.03 | 15.08 | 15.47 |
| 17 | 17.89 | 12.5 | 11.9 | 12.5 | 11.9 | 11.9 | 12.14 | 16.72 | 16.33 | 13.13 | 12.5 | 16.54 | 12.83 | 13.16 |
| 18 | 15.35 | 10.72 | 10.21 | 10.72 | 10.21 | 10.21 | 10.34 | 14.27 | 13.87 | 11.26 | 10.72 | 14.18 | 10.81 | 11.08 |
| 19 | 12.92 | 9.03 | 8.6 | 9.03 | 8.6 | 8.6 | 8.67 | 11.96 | 11.57 | 9.48 | 9.03 | 11.94 | 8.97 | 9.18 |
| 20 | 10.61 | 7.41 | 7.06 | 7.41 | 7.06 | 7.06 | 7.1 | 9.77 | 9.42 | 7.78 | 7.41 | 9.8 | 7.27 | 7.42 |
| 21 | 8.37 | 5.85 | 5.57 | 5.85 | 5.57 | 5.57 | 5.59 | 7.68 | 7.38 | 6.14 | 5.85 | 7.74 | 5.68 | 5.79 |
| 22 | 6.21 | 4.34 | 4.13 | 4.34 | 4.13 | 4.13 | 4.14 | 5.68 | 5.43 | 4.55 | 4.34 | 5.74 | 4.18 | 4.24 |
| 23 | 4.09 | 2.86 | 2.72 | 2.86 | 2.72 | 2.72 | 2.73 | 3.73 | 3.56 | 3 | 2.86 | 3.78 | 2.74 | 2.77 |
| 24 | 2.03 | 1.42 | 1.35 | 1.42 | 1.35 | 1.35 | 1.35 | 1.84 | 1.75 | 1.49 | 1.42 | 1.87 | 1.35 | 1.36 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 102.68 | 100 | 102.68 | 102.68 | 102.68 | 102.68 | 102.68 | 102.68 | 102.68 | 102.68 | 102.68 | 102.68 | 102.68 | 102.68 |
| 2 | 104.22 | 100 | 104.22 | 104.22 | 104.22 | 104.22 | 104.22 | 104.22 | 104.22 | 104.22 | 104.22 | 104.22 | 104.22 | 104.22 |
| 3 | 106.13 | 100 | 106.13 | 106.13 | 106.13 | 106.13 | 106.13 | 106.13 | 106.13 | 106.13 | 106.13 | 106.13 | 106.13 | 106.13 |
| 4 | 108.17 | 100 | 108.17 | 108.17 | 108.17 | 108.17 | 108.17 | 108.17 | 108.17 | 108.17 | 108.17 | 108.17 | 108.17 | 108.17 |
| 5 | 110.4 | 100 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 | 110.4 |
| 6 | 113.97 | 100 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 | 113.97 |
| 7 | 118.52 | 100 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 | 118.52 |
| 8 | 124.42 | 100 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 | 124.42 |
| 9 | 132.28 | 100 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 | 132.28 |
| 10 | 143.11 | 100 | 95.2 | 100 | 143.11 | 127.14 | 127.14 | 143.11 | 143.11 | 105.02 | 100 | 132.28 | 132.28 | 132.28 |
| 11 | 143.11 | 100 | 95.2 | 100 | 143.11 | 111.17 | 116.49 | 141.04 | 140.85 | 105.02 | 100 | 132.28 | 125.11 | 126.27 |
| 12 | 143.11 | 100 | 95.2 | 100 | 143.11 | 95.2 | 109.39 | 139.3 | 138.78 | 105.02 | 100 | 132.28 | 119.28 | 121.21 |
| 13 | 143.11 | 100 | 95.2 | 100 | 127.14 | 95.2 | 104.66 | 137.84 | 136.88 | 105.02 | 100 | 132.28 | 114.53 | 116.92 |
| 14 | 143.11 | 100 | 95.2 | 100 | 111.17 | 95.2 | 101.51 | 136.59 | 135.13 | 105.02 | 100 | 132.28 | 110.64 | 113.28 |
| 15 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 99.4 | 135.52 | 133.52 | 105.02 | 100 | 132.28 | 107.45 | 110.18 |
| 16 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 98 | 134.59 | 132.03 | 105.02 | 100 | 132.28 | 104.82 | 107.53 |
| 17 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 97.07 | 133.77 | 130.64 | 105.02 | 100 | 132.28 | 102.64 | 105.26 |
| 18 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 96.44 | 133.05 | 129.37 | 105.02 | 100 | 132.28 | 100.85 | 103.31 |
| 19 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 96.03 | 132.41 | 128.19 | 105.02 | 100 | 132.28 | 99.37 | 101.62 |
| 20 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.75 | 131.84 | 127.12 | 105.02 | 100 | 132.28 | 98.14 | 100.16 |
| 21 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.57 | 131.33 | 126.14 | 105.02 | 100 | 132.28 | 97.13 | 98.89 |
| 22 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.44 | 130.87 | 125.24 | 105.02 | 100 | 132.28 | 96.3 | 97.78 |
| 23 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.36 | 130.46 | 124.4 | 105.02 | 100 | 132.28 | 95.63 | 96.81 |
| 24 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.31 | 130.08 | 123.64 | 105.02 | 100 | 132.28 | 95.14 | 95.95 |
| 25 | 96.3 | 100 | 64.05 | 100 | 64.05 | 64.05 | 64.1 | 87.29 | 97.62 | 96.3 | 96.3 | 89.01 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:COMMS. +30% DUR 10

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 29.12 | 30.97 | 29.12 | 29.12 | 29.12 | 29.12 | 29.12 | 29.12 | 29.12 | 29.12 | 29.12 | 29.12 | 29.12 | 29.12 |
| 2 | -6.87 | -5.57 | -6.87 | -6.87 | -6.87 | -6.87 | -6.87 | -6.87 | -6.87 | -6.87 | -6.87 | -6.87 | -6.87 | -6.87 |
| 3 | 2.87 | 4.05 | 2.87 | 2.87 | 2.87 | 2.87 | 2.87 | 2.87 | 2.87 | 2.87 | 2.87 | 2.87 | 2.87 | 2.87 |
| 4 | 2.65 | 3.77 | 2.65 | 2.65 | 2.65 | 2.65 | 2.65 | 2.65 | 2.65 | 2.65 | 2.65 | 2.65 | 2.65 | 2.65 |
| 5 | 2.54 | 3.65 | 2.54 | 2.54 | 2.54 | 2.54 | 2.54 | 2.54 | 2.54 | 2.54 | 2.54 | 2.54 | 2.54 | 2.54 |
| 6 | 7.07 | 8.18 | 7.07 | 7.07 | 7.07 | 7.07 | 7.07 | 7.07 | 7.07 | 7.07 | 7.07 | 7.07 | 7.07 | 7.07 |
| 7 | 6.26 | 7.39 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 |
| 8 | 5.6 | 6.76 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| 9 | 5.04 | 6.23 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 |
| 10 | 4.57 | 5.81 | 18.35 | 16.97 | 4.57 | 9.16 | 9.16 | 4.57 | 4.57 | 15.52 | 16.97 | 7.68 | 7.68 | 7.68 |
| 11 | 4.13 | 2.88 | 2.74 | 2.88 | 4.13 | 7.8 | 6.42 | 4.66 | 4.71 | 3.03 | 2.88 | 3.81 | 5.67 | 5.37 |
| 12 | 3.8 | 2.65 | 2.53 | 2.65 | 3.8 | 6.66 | 4.74 | 4.14 | 4.22 | 2.79 | 2.65 | 3.51 | 4.67 | 4.53 |
| 13 | 3.51 | 2.45 | 2.33 | 2.45 | 6.82 | 2.33 | 3.66 | 3.72 | 3.79 | 2.57 | 2.45 | 3.24 | 3.91 | 3.86 |
| 14 | 3.26 | 2.27 | 2.17 | 2.27 | 5.85 | 2.17 | 2.96 | 3.37 | 3.44 | 2.39 | 2.27 | 3.01 | 3.32 | 3.33 |
| 15 | 3.04 | 2.12 | 2.02 | 2.12 | 4.97 | 2.02 | 2.5 | 3.07 | 3.13 | 2.23 | 2.12 | 2.81 | 2.87 | 2.91 |
| 16 | 2.85 | 1.99 | 1.89 | 1.99 | 1.89 | 1.89 | 2.18 | 2.83 | 2.87 | 2.09 | 1.99 | 2.63 | 2.52 | 2.57 |
| 17 | 2.69 | 1.88 | 1.79 | 1.88 | 1.79 | 1.79 | 1.96 | 2.63 | 2.66 | 1.97 | 1.88 | 2.49 | 2.24 | 2.31 |
| 18 | 2.55 | 1.78 | 1.69 | 1.78 | 1.69 | 1.69 | 1.79 | 2.46 | 2.46 | 1.87 | 1.78 | 2.35 | 2.02 | 2.08 |
| 19 | 2.42 | 1.69 | 1.61 | 1.69 | 1.61 | 1.61 | 1.67 | 2.31 | 2.3 | 1.78 | 1.69 | 2.24 | 1.84 | 1.9 |
| 20 | 2.32 | 1.62 | 1.54 | 1.62 | 1.54 | 1.54 | 1.57 | 2.18 | 2.15 | 1.7 | 1.62 | 2.14 | 1.7 | 1.75 |
| 21 | 2.23 | 1.56 | 1.48 | 1.56 | 1.48 | 1.48 | 1.5 | 2.09 | 2.04 | 1.64 | 1.56 | 2.06 | 1.59 | 1.64 |
| 22 | 2.17 | 1.51 | 1.44 | 1.51 | 1.44 | 1.44 | 1.45 | 2.01 | 1.95 | 1.59 | 1.51 | 2 | 1.51 | 1.55 |
| 23 | 2.11 | 1.48 | 1.4 | 1.48 | 1.4 | 1.4 | 1.41 | 1.94 | 1.87 | 1.55 | 1.48 | 1.95 | 1.44 | 1.47 |
| 24 | 2.07 | 1.44 | 1.37 | 1.44 | 1.37 | 1.37 | 1.38 | 1.89 | 1.81 | 1.52 | 1.44 | 1.91 | 1.39 | 1.41 |
| 25 | 2.03 | 1.42 | 1.35 | 1.42 | 1.35 | 1.35 | 1.35 | 1.84 | 1.75 | 1.49 | 1.42 | 1.87 | 1.35 | 1.36 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 94.03 | 100 | 94.03 | 94.03 | 94.03 | 94.03 | 94.03 | 94.03 | 94.03 | 94.03 | 94.03 | 94.03 | 94.03 | 94.03 |
| 2 | 123.38 | 100 | 123.38 | 123.38 | 123.38 | 123.38 | 123.38 | 123.38 | 123.38 | 123.38 | 123.38 | 123.38 | 123.38 | 123.38 |
| 3 | 70.89 | 100 | 70.89 | 70.89 | 70.89 | 70.89 | 70.89 | 70.89 | 70.89 | 70.89 | 70.89 | 70.89 | 70.89 | 70.89 |
| 4 | 70.13 | 100 | 70.13 | 70.13 | 70.13 | 70.13 | 70.13 | 70.13 | 70.13 | 70.13 | 70.13 | 70.13 | 70.13 | 70.13 |
| 5 | 69.62 | 100 | 69.62 | 69.62 | 69.62 | 69.62 | 69.62 | 69.62 | 69.62 | 69.62 | 69.62 | 69.62 | 69.62 | 69.62 |
| 6 | 86.4 | 100 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 |
| 7 | 84.73 | 100 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 | 84.73 |
| 8 | 82.89 | 100 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 | 82.89 |
| 9 | 80.85 | 100 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 | 80.85 |
| 10 | 78.65 | 100 | 315.87 | 292.09 | 78.65 | 157.72 | 157.72 | 78.65 | 78.65 | 267.25 | 292.09 | 132.28 | 132.28 | 132.28 |
| 11 | 143.11 | 100 | 95.2 | 100 | 143.11 | 270.52 | 222.73 | 161.77 | 163.46 | 105.02 | 100 | 132.28 | 196.62 | 186.2 |
| 12 | 143.11 | 100 | 95.2 | 100 | 143.11 | 250.94 | 178.62 | 156.2 | 158.95 | 105.02 | 100 | 132.28 | 176.13 | 170.63 |
| 13 | 143.11 | 100 | 95.2 | 100 | 278.5 | 95.2 | 149.51 | 151.7 | 154.86 | 105.02 | 100 | 132.28 | 159.58 | 157.54 |
| 14 | 143.11 | 100 | 95.2 | 100 | 257.03 | 95.2 | 130.32 | 147.99 | 151.09 | 105.02 | 100 | 132.28 | 146.16 | 146.51 |
| 15 | 143.11 | 100 | 95.2 | 100 | 234.4 | 95.2 | 117.74 | 144.88 | 147.58 | 105.02 | 100 | 132.28 | 135.28 | 137.19 |
| 16 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 109.54 | 142.26 | 144.3 | 105.02 | 100 | 132.28 | 126.45 | 129.32 |
| 17 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 104.22 | 140.02 | 141.24 | 105.02 | 100 | 132.28 | 119.27 | 122.65 |
| 18 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 100.82 | 138.11 | 138.34 | 105.02 | 100 | 132.28 | 113.45 | 117.03 |
| 19 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 98.66 | 136.45 | 135.63 | 105.02 | 100 | 132.28 | 108.75 | 112.29 |
| 20 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 97.3 | 135.01 | 133.08 | 105.02 | 100 | 132.28 | 104.97 | 108.29 |
| 21 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 96.44 | 133.75 | 130.79 | 105.02 | 100 | 132.28 | 101.93 | 104.92 |
| 22 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.92 | 132.65 | 128.74 | 105.02 | 100 | 132.28 | 99.51 | 102.07 |
| 23 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.6 | 131.68 | 126.86 | 105.02 | 100 | 132.28 | 97.59 | 99.67 |
| 24 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.41 | 130.83 | 125.16 | 105.02 | 100 | 132.28 | 96.12 | 97.65 |
| 25 | 143.11 | 100 | 95.2 | 100 | 95.2 | 95.2 | 95.31 | 130.08 | 123.64 | 105.02 | 100 | 132.28 | 95.14 | 95.95 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC
METHODS COMPARED TO EPHS
+30% DUR 10
(NON-RESERVE STATISTICS HAVE BEEN MULTIPLIED BY 10)

| | | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOB | STATIC | FORMULA | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| OTHER-EPHS-ASSET | | -DIFF | 1049 | 0 | 354 | 424 | 691 | 450 | 517 | 963 | 965 | 496 | 424 | 892 | 617 | 643 |
| | | -ABS(DIFF) | 1049 | 0 | 493 | 424 | 749 | 551 | 553 | 963 | 965 | 496 | 424 | 892 | 627 | 648 |
| | | -DIFF*2 | 6005 | 0 | 2446 | 2402 | 4552 | 2786 | 2844 | 5326 | 5369 | 2450 | 2402 | 4422 | 3246 | 3329 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 178 | 0 | 180 | 160 | 189 | 176 | 166 | 178 | 178 | 160 | 160 | 160 | 163 | 162 |
| | | -DIFF*2 | 137 | 0 | 886 | 716 | 303 | 340 | 230 | 147 | 146 | 562 | 716 | 123 | 175 | 165 |
| COMMS-EPHS-ASSET | | -DIFF | 1460 | 0 | 493 | 590 | 961 | 626 | 720 | 1340 | 1304 | 691 | 590 | 1242 | 858 | 895 |
| | | -ABS(DIFF) | 1460 | 0 | 687 | 590 | 1043 | 767 | 769 | 1340 | 1304 | 691 | 590 | 1242 | 872 | 902 |
| | | -DIFF*2 | 11632 | 0 | 4739 | 4653 | 8819 | 5397 | 5509 | 10318 | 10032 | 4747 | 4653 | 8565 | 6288 | 6448 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 248 | 0 | 251 | 223 | 264 | 245 | 231 | 248 | 248 | 223 | 223 | 223 | 227 | 225 |
| | | -DIFF*2 | 266 | 0 | 1716 | 1388 | 588 | 658 | 445 | 285 | 291 | 1088 | 1388 | 239 | 339 | 319 |
| OTHER-EPHS-BENEFIT | | RES DIF | -6 | 0 | 24 | 9 | 14 | 20 | 14 | -6 | -6 | -6 | 9 | -6 | 6 | 2 |
| | | RESERVE INC DIF | -7 | 0 | 25 | 10 | 13 | 21 | 9 | -7 | -7 | -5 | 10 | -5 | 3 | 1 |
| COMMS-EPHS-BENEFIT | | RES DIF | -6 | 0 | 24 | 9 | 14 | 20 | 14 | -6 | -6 | -6 | 9 | -6 | 6 | 2 |
| | | RESERVE INC DIF | -7 | 0 | 25 | 10 | 13 | 21 | 9 | -7 | -7 | -5 | 10 | -5 | 3 | 1 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

RANK OF STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS

+30% DUR 10

| LOB | STATIC | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | EPHS-ASSET | 3 | 1 | 9.9 | 5 | 6 | 11 | 12 | 4 | 2 | 9.1 | 7 | 8 |
| | -AMORT | 11.9 | 9.1 | 7.5 | 8 | 6.1 | 3.7 | 2.7 | 8.4 | 10.3 | 1.1 | 5.1 | 4.1 |
| COMMS | EPHS-ASSET | 3 | 1 | 9.9 | 5 | 6 | 12 | 11 | 4 | 2 | 9.1 | 7 | 8 |
| | -AMORT | 11.9 | 9.2 | 7.5 | 8 | 6.1 | 2.8 | 3.6 | 8.4 | 10.3 | 1 | 5.1 | 4.1 |

APPENDIX 2—*Continued*

INPUT FOR DYNAMIC METHOD COMPARISON TESTS
110% FOR 5,80% FOR 10,120% FOR 10

| YEAR | TOTAL EXP. TERMINA-TIONS(%) | ENDING EXPECTED L(T) | TOTAL ACT. TERMINA-TIONS(%) | ENDING ACTUAL L(T) | INTEREST (%) | COMMISSION (%) |
|---|---|---|---|---|---|---|
| 1 | 37 | .63 | 40.7 | .593 | 7.500 | 55.0 |
| 2 | 19.1 | .5097 | 21.01 | .4684 | 7.500 | 20.0 |
| 3 | 14.8 | .4342 | 16.28 | .3922 | 7.500 | 10.0 |
| 4 | 12.6 | .3795 | 13.86 | .3378 | 7.500 | 9.0 |
| 5 | 11.5 | .3359 | 12.65 | .2951 | 7.500 | 8.0 |
| 6 | 10.9 | .2993 | 8.72 | .2693 | 7.500 | .0 |
| 7 | 10.3 | .2684 | 8.24 | .2471 | 7.500 | .0 |
| 8 | 10 | .2416 | 8 | .2274 | 7.500 | .0 |
| 9 | 9.6 | .2184 | 7.68 | .2099 | 7.500 | .0 |
| 10 | 10.4 | .1957 | 8.32 | .1924 | 7.500 | .0 |
| 11 | 9.4 | .1773 | 7.52 | .178 | 7.367 | .0 |
| 12 | 9.3 | .1608 | 7.44 | .1647 | 7.233 | .0 |
| 13 | 9.1 | .1462 | 7.28 | .1527 | 7.100 | .0 |
| 14 | 8.9 | .1332 | 7.12 | .1419 | 6.967 | .0 |
| 15 | 8.7 | .1216 | 6.96 | .132 | 6.833 | .0 |
| 16 | 8.4 | .1114 | 10.08 | .1187 | 6.700 | .0 |
| 17 | 8.4 | .102 | 10.08 | .1067 | 6.567 | .0 |
| 18 | 8.2 | .0936 | 9.84 | .0962 | 6.433 | .0 |
| 19 | 8.1 | .0861 | 9.72 | .0869 | 6.300 | .0 |
| 20 | 7.6 | .0795 | 9.12 | .0789 | 6.167 | .0 |
| 21 | 7.2 | .0738 | 8.64 | .0721 | 6.033 | .0 |
| 22 | 7.1 | .0686 | 8.52 | .066 | 5.900 | .0 |
| 23 | 6.9 | .0638 | 8.28 | .0605 | 5.767 | .0 |
| 24 | 6.7 | .0595 | 8.04 | .0557 | 5.633 | .0 |
| 25 | 6.4 | .0557 | 7.68 | .0514 | 5.500 | .0 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:OTHER. 110% FOR 5,80% FOR 10,120% FOR 10

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 81.19 | 79.86 | 76.42 | 79.97 | 81.19 | 79.6 | 79.6 | 81.19 | 81.19 | 80.35 | 79.97 | 79.97 | 79.97 | 79.97 |
| 2 | 70.71 | 69.46 | 64.98 | 68.98 | 70.71 | 67.41 | 67.88 | 69.1 | 70.22 | 69.51 | 68.98 | 69.32 | 68.6 | 68.74 |
| 3 | 62.6 | 61.73 | 56.53 | 60.53 | 62.6 | 57.66 | 58.91 | 60.31 | 61.74 | 61.14 | 60.53 | 61.19 | 59.86 | 60.09 |
| 4 | 55.87 | 55.52 | 49.73 | 53.55 | 54.07 | 50.51 | 51.63 | 53.26 | 54.72 | 54.22 | 53.55 | 54.47 | 52.69 | 52.96 |
| 5 | 50.08 | 50.35 | 43.99 | 47.58 | 46.84 | 44.6 | 45.51 | 47.33 | 48.71 | 48.27 | 47.58 | 48.72 | 46.59 | 46.88 |
| 6 | 45 | 45.97 | 40.5 | 43.51 | 40.63 | 40.02 | 40.76 | 42.22 | 43.47 | 43.97 | 43.51 | 43.95 | 41.57 | 41.86 |
| 7 | 40.5 | 41.97 | 37.28 | 39.84 | 36.53 | 36.44 | 36.89 | 37.87 | 38.91 | 40.12 | 39.84 | 39.7 | 37.36 | 37.61 |
| 8 | 36.47 | 38.29 | 34.32 | 36.51 | 32.86 | 33.58 | 33.59 | 34.07 | 34.9 | 36.65 | 36.51 | 35.88 | 33.75 | 33.95 |
| 9 | 32.85 | 34.88 | 31.57 | 33.47 | 29.57 | 30.91 | 30.69 | 30.7 | 31.34 | 33.48 | 33.47 | 32.43 | 30.61 | 30.74 |
| 10 | 29.57 | 31.69 | 29.08 | 30.72 | 27.21 | 28.44 | 28.11 | 27.67 | 28.15 | 30.64 | 30.72 | 29.29 | 27.82 | 27.89 |
| 11 | 26.6 | 28.71 | 26.71 | 28.14 | 25.03 | 26.15 | 25.76 | 24.95 | 25.3 | 27.99 | 28.14 | 26.45 | 25.33 | 25.35 |
| 12 | 23.88 | 25.88 | 24.46 | 25.72 | 22.95 | 23.97 | 23.57 | 22.45 | 22.69 | 25.51 | 25.72 | 23.81 | 23.05 | 23.03 |
| 13 | 21.36 | 23.19 | 22.32 | 23.42 | 20.98 | 21.88 | 21.49 | 20.14 | 20.3 | 23.18 | 23.42 | 21.37 | 20.93 | 20.87 |
| 14 | 19.02 | 20.6 | 20.26 | 21.23 | 19.08 | 19.87 | 19.51 | 17.99 | 18.09 | 20.98 | 21.23 | 19.09 | 18.95 | 18.86 |
| 15 | 16.84 | 18.11 | 18.28 | 19.13 | 17.25 | 17.94 | 17.61 | 15.98 | 16.03 | 18.87 | 19.13 | 16.95 | 17.07 | 16.97 |
| 16 | 14.79 | 15.71 | 15.76 | 16.51 | 15.45 | 15.86 | 15.57 | 14.09 | 14.1 | 16.31 | 16.51 | 14.84 | 15.17 | 15.06 |
| 17 | 12.86 | 13.49 | 13.45 | 14.1 | 13.69 | 13.7 | 13.5 | 12.27 | 12.27 | 13.95 | 14.1 | 12.86 | 13.26 | 13.16 |
| 18 | 11.03 | 11.43 | 11.33 | 11.89 | 11.97 | 11.54 | 11.5 | 10.55 | 10.53 | 11.77 | 11.89 | 10.99 | 11.37 | 11.29 |
| 19 | 9.28 | 9.52 | 9.37 | 9.84 | 9.9 | 9.54 | 9.58 | 8.89 | 8.87 | 9.75 | 9.84 | 9.22 | 9.53 | 9.48 |
| 20 | 7.62 | 7.74 | 7.57 | 7.94 | 7.98 | 7.7 | 7.76 | 7.3 | 7.28 | 7.88 | 7.94 | 7.54 | 7.75 | 7.73 |
| 21 | 6.02 | 6.05 | 5.88 | 6.18 | 6.18 | 5.98 | 6.05 | 5.77 | 5.74 | 6.13 | 6.18 | 5.93 | 6.05 | 6.05 |
| 22 | 4.46 | 4.45 | 4.29 | 4.51 | 4.51 | 4.36 | 4.42 | 4.28 | 4.26 | 4.47 | 4.51 | 4.37 | 4.41 | 4.42 |
| 23 | 2.94 | 2.91 | 2.79 | 2.93 | 2.92 | 2.83 | 2.87 | 2.82 | 2.81 | 2.91 | 2.93 | 2.87 | 2.85 | 2.87 |
| 24 | 1.46 | 1.43 | 1.36 | 1.43 | 1.42 | 1.38 | 1.4 | 1.4 | 1.39 | 1.42 | 1.43 | 1.41 | 1.37 | 1.39 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 101.66 | 100 | 95.69 | 100.13 | 101.66 | 99.67 | 99.67 | 101.66 | 101.66 | 100.62 | 100.13 | 100.13 | 100.13 | 100.13 |
| 2 | 101.79 | 100 | 93.55 | 99.3 | 101.79 | 97.05 | 97.71 | 99.48 | 101.08 | 100.06 | 99.3 | 99.8 | 98.76 | 98.96 |
| 3 | 101.41 | 100 | 91.58 | 98.06 | 101.41 | 93.42 | 95.43 | 97.7 | 100.02 | 99.05 | 98.06 | 99.12 | 96.98 | 97.34 |
| 4 | 100.63 | 100 | 89.57 | 96.46 | 97.38 | 90.98 | 92.99 | 95.93 | 98.57 | 97.65 | 96.46 | 98.12 | 94.9 | 95.38 |
| 5 | 99.46 | 100 | 87.38 | 94.51 | 93.04 | 88.58 | 90.4 | 94 | 96.75 | 95.88 | 94.51 | 96.76 | 92.54 | 93.12 |
| 6 | 97.88 | 100 | 88.09 | 94.65 | 88.4 | 87.07 | 88.67 | 91.85 | 94.56 | 95.65 | 94.65 | 95.6 | 90.43 | 91.07 |
| 7 | 96.49 | 100 | 88.83 | 94.92 | 87.03 | 86.81 | 87.88 | 90.23 | 92.71 | 95.59 | 94.92 | 94.58 | 89.02 | 89.62 |
| 8 | 95.25 | 100 | 89.64 | 95.36 | 85.82 | 87.69 | 87.72 | 88.98 | 91.15 | 95.71 | 95.36 | 93.7 | 88.16 | 88.66 |
| 9 | 94.19 | 100 | 90.53 | 95.95 | 84.77 | 88.63 | 88 | 88.02 | 89.86 | 96.01 | 95.95 | 92.97 | 87.75 | 88.12 |
| 10 | 93.3 | 100 | 91.75 | 96.93 | 85.87 | 89.74 | 88.7 | 87.32 | 88.82 | 96.67 | 96.93 | 92.44 | 87.78 | 88 |
| 11 | 92.65 | 100 | 93.01 | 98 | 87.16 | 91.06 | 89.73 | 86.9 | 88.09 | 97.47 | 98 | 92.1 | 88.22 | 88.29 |
| 12 | 92.24 | 100 | 94.49 | 99.34 | 88.65 | 92.6 | 91.05 | 86.75 | 87.66 | 98.57 | 99.34 | 91.99 | 89.05 | 88.95 |
| 13 | 92.11 | 100 | 96.25 | 101 | 90.47 | 94.35 | 92.69 | 86.88 | 87.54 | 99.99 | 101 | 92.15 | 90.28 | 90.03 |
| 14 | 92.31 | 100 | 98.34 | 103.05 | 92.62 | 96.46 | 94.71 | 87.35 | 87.79 | 101.81 | 103.05 | 92.66 | 91.98 | 91.57 |
| 15 | 92.95 | 100 | 100.91 | 105.61 | 95.22 | 99.02 | 97.22 | 88.24 | 88.5 | 104.15 | 105.61 | 93.6 | 94.23 | 93.67 |
| 16 | 94.16 | 100 | 100.35 | 105.13 | 98.38 | 100.97 | 99.11 | 89.68 | 89.79 | 103.84 | 105.13 | 94.51 | 96.6 | 95.87 |
| 17 | 95.33 | 100 | 99.73 | 104.57 | 101.55 | 101.61 | 100.14 | 91.02 | 90.99 | 103.42 | 104.57 | 95.35 | 98.32 | 97.56 |
| 18 | 96.44 | 100 | 99.09 | 103.96 | 104.7 | 100.92 | 100.56 | 92.24 | 92.1 | 102.93 | 103.96 | 96.12 | 99.46 | 98.77 |
| 19 | 97.49 | 100 | 98.4 | 103.28 | 103.95 | 100.19 | 100.57 | 93.36 | 93.12 | 102.35 | 103.28 | 96.8 | 100.07 | 99.54 |
| 20 | 98.46 | 100 | 97.75 | 102.63 | 103.08 | 99.43 | 100.3 | 94.37 | 94.04 | 101.77 | 102.63 | 97.4 | 100.19 | 99.9 |
| 21 | 99.38 | 100 | 97.13 | 102 | 102.11 | 98.7 | 99.86 | 95.3 | 94.89 | 101.2 | 102 | 97.91 | 99.87 | 99.87 |
| 22 | 100.25 | 100 | 96.48 | 101.34 | 101.33 | 98 | 99.32 | 96.16 | 95.67 | 100.58 | 101.34 | 98.31 | 99.1 | 99.45 |
| 23 | 101.08 | 100 | 95.84 | 100.67 | 100.48 | 97.3 | 98.71 | 96.96 | 96.4 | 99.94 | 100.67 | 98.57 | 97.76 | 98.59 |
| 24 | 101.86 | 100 | 95.19 | 100 | 99.55 | 96.6 | 98.05 | 97.69 | 97.08 | 99.28 | 100 | 98.57 | 95.57 | 97.13 |
| 25 | 81.82 | 100 | 75.42 | 100 | 78.8 | 76.49 | 77.64 | 78.45 | 82.4 | 81.82 | 81.82 | 79.17 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION
EXPENSE TYPE:OTHER. 110% FOR 5,80% FOR 10,120% FOR 10

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 18.81 | 20.14 | 23.58 | 20.03 | 18.81 | 20.4 | 20.4 | 18.81 | 18.81 | 19.65 | 20.03 | 20.03 | 20.03 | 20.03 |
| 2 | 10.49 | 10.4 | 11.44 | 10.99 | 10.49 | 12.19 | 11.73 | 12.09 | 10.98 | 10.85 | 10.99 | 10.65 | 11.37 | 11.23 |
| 3 | 8.11 | 7.74 | 8.45 | 8.45 | 8.11 | 9.75 | 8.97 | 8.79 | 8.48 | 8.37 | 8.45 | 8.14 | 8.74 | 8.65 |
| 4 | 6.73 | 6.21 | 6.8 | 6.97 | 8.53 | 7.15 | 7.28 | 7.05 | 7.01 | 6.92 | 6.97 | 6.71 | 7.17 | 7.13 |
| 5 | 5.79 | 5.17 | 5.74 | 5.97 | 7.23 | 5.92 | 6.11 | 5.93 | 6.01 | 5.95 | 5.97 | 5.76 | 6.1 | 6.08 |
| 6 | 5.08 | 4.38 | 3.5 | 4.08 | 6.21 | 4.57 | 4.75 | 5.11 | 5.25 | 4.3 | 4.08 | 4.77 | 5.02 | 5.02 |
| 7 | 4.5 | 4 | 3.21 | 3.67 | 4.1 | 3.59 | 3.88 | 4.35 | 4.55 | 3.85 | 3.67 | 4.25 | 4.21 | 4.25 |
| 8 | 4.03 | 3.68 | 2.96 | 3.33 | 3.67 | 2.86 | 3.3 | 3.8 | 4.01 | 3.47 | 3.33 | 3.82 | 3.61 | 3.67 |
| 9 | 3.62 | 3.41 | 2.75 | 3.05 | 3.3 | 2.66 | 2.89 | 3.37 | 3.56 | 3.16 | 3.05 | 3.45 | 3.15 | 3.21 |
| 10 | 3.28 | 3.19 | 2.49 | 2.75 | 2.35 | 2.47 | 2.58 | 3.03 | 3.19 | 2.85 | 2.75 | 3.13 | 2.79 | 2.85 |
| 11 | 2.96 | 2.98 | 2.37 | 2.58 | 2.19 | 2.29 | 2.35 | 2.72 | 2.85 | 2.65 | 2.58 | 2.85 | 2.49 | 2.54 |
| 12 | 2.73 | 2.83 | 2.25 | 2.42 | 2.08 | 2.18 | 2.2 | 2.5 | 2.61 | 2.47 | 2.42 | 2.63 | 2.28 | 2.33 |
| 13 | 2.52 | 2.7 | 2.14 | 2.3 | 1.97 | 2.09 | 2.08 | 2.31 | 2.39 | 2.33 | 2.3 | 2.44 | 2.12 | 2.15 |
| 14 | 2.34 | 2.59 | 2.06 | 2.19 | 1.9 | 2.01 | 1.98 | 2.15 | 2.21 | 2.21 | 2.19 | 2.28 | 1.98 | 2.01 |
| 15 | 2.18 | 2.49 | 1.98 | 2.1 | 1.83 | 1.94 | 1.9 | 2.01 | 2.06 | 2.11 | 2.1 | 2.14 | 1.88 | 1.9 |
| 16 | 2.05 | 2.41 | 2.52 | 2.62 | 1.79 | 2.08 | 2.04 | 1.9 | 1.93 | 2.56 | 2.62 | 2.11 | 1.9 | 1.91 |
| 17 | 1.93 | 2.22 | 2.31 | 2.41 | 1.76 | 2.16 | 2.06 | 1.81 | 1.83 | 2.36 | 2.41 | 1.98 | 1.91 | 1.9 |
| 18 | 1.83 | 2.05 | 2.12 | 2.22 | 1.72 | 2.16 | 2.01 | 1.73 | 1.74 | 2.18 | 2.22 | 1.87 | 1.89 | 1.86 |
| 19 | 1.74 | 1.91 | 1.96 | 2.05 | 2.07 | 2 | 1.92 | 1.65 | 1.66 | 2.02 | 2.05 | 1.77 | 1.84 | 1.81 |
| 20 | 1.66 | 1.78 | 1.81 | 1.89 | 1.92 | 1.85 | 1.81 | 1.59 | 1.59 | 1.87 | 1.89 | 1.68 | 1.78 | 1.75 |
| 21 | 1.6 | 1.69 | 1.68 | 1.77 | 1.8 | 1.72 | 1.72 | 1.53 | 1.53 | 1.75 | 1.77 | 1.61 | 1.71 | 1.68 |
| 22 | 1.56 | 1.61 | 1.59 | 1.67 | 1.67 | 1.62 | 1.63 | 1.49 | 1.49 | 1.65 | 1.67 | 1.55 | 1.64 | 1.62 |
| 23 | 1.52 | 1.54 | 1.5 | 1.58 | 1.58 | 1.53 | 1.55 | 1.46 | 1.45 | 1.57 | 1.58 | 1.5 | 1.56 | 1.55 |
| 24 | 1.48 | 1.48 | 1.43 | 1.5 | 1.5 | 1.45 | 1.47 | 1.42 | 1.42 | 1.49 | 1.5 | 1.46 | 1.48 | 1.48 |
| 25 | 1.46 | 1.43 | 1.36 | 1.43 | 1.42 | 1.38 | 1.4 | 1.4 | 1.39 | 1.42 | 1.43 | 1.41 | 1.37 | 1.39 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 93.4 | 100 | 117.08 | 99.47 | 93.4 | 101.3 | 101.3 | 93.4 | 93.4 | 97.56 | 99.47 | 99.47 | 99.47 | 99.47 |
| 2 | 100.83 | 100 | 110.01 | 105.68 | 100.83 | 117.2 | 112.76 | 116.26 | 105.54 | 104.31 | 105.68 | 102.37 | 109.33 | 107.99 |
| 3 | 104.78 | 100 | 109.22 | 109.26 | 104.78 | 126.05 | 115.93 | 113.63 | 109.59 | 108.15 | 109.26 | 105.2 | 112.97 | 111.88 |
| 4 | 108.39 | 100 | 109.6 | 112.31 | 137.46 | 115.2 | 117.27 | 113.59 | 112.97 | 111.52 | 112.31 | 108.12 | 115.56 | 114.82 |
| 5 | 112.04 | 100 | 110.92 | 115.46 | 139.7 | 114.38 | 118.22 | 114.66 | 116.25 | 114.96 | 115.46 | 111.3 | 117.87 | 117.48 |
| 6 | 116.03 | 100 | 79.85 | 93.1 | 141.73 | 104.39 | 108.49 | 116.65 | 119.8 | 98.29 | 93.1 | 108.95 | 114.66 | 114.61 |
| 7 | 112.58 | 100 | 80.37 | 91.75 | 102.71 | 89.8 | 96.99 | 108.87 | 113.96 | 96.29 | 91.75 | 106.32 | 105.27 | 106.31 |
| 8 | 109.3 | 100 | 80.37 | 90.31 | 99.62 | 77.67 | 89.55 | 103.21 | 108.91 | 94.28 | 90.31 | 103.71 | 97.98 | 99.58 |
| 9 | 106.11 | 100 | 80.62 | 89.34 | 96.6 | 78.07 | 84.82 | 98.72 | 104.35 | 92.69 | 89.34 | 101.18 | 92.28 | 94.11 |
| 10 | 103.03 | 100 | 78.32 | 86.28 | 73.82 | 77.53 | 81.07 | 95.04 | 100.25 | 89.41 | 86.28 | 98.3 | 87.47 | 89.31 |
| 11 | 99.54 | 100 | 79.66 | 86.59 | 73.41 | 77.07 | 78.8 | 91.31 | 95.78 | 88.91 | 86.59 | 95.69 | 83.52 | 85.27 |
| 12 | 96.43 | 100 | 79.43 | 85.67 | 73.52 | 76.96 | 77.62 | 88.34 | 92.09 | 87.46 | 85.67 | 93.09 | 80.68 | 82.21 |
| 13 | 93.39 | 100 | 79.43 | 85.09 | 73.05 | 77.52 | 76.92 | 85.62 | 88.66 | 86.36 | 85.09 | 90.57 | 78.45 | 79.72 |
| 14 | 90.47 | 100 | 79.52 | 84.68 | 73.34 | 77.59 | 76.58 | 83.14 | 85.53 | 85.46 | 84.68 | 88.15 | 76.77 | 77.77 |
| 15 | 87.68 | 100 | 79.68 | 84.44 | 73.7 | 77.81 | 76.52 | 80.87 | 82.66 | 84.77 | 84.44 | 85.82 | 75.54 | 76.27 |
| 16 | 85.03 | 100 | 104.54 | 108.73 | 74.56 | 86.32 | 84.87 | 78.78 | 80.06 | 106.19 | 108.73 | 87.66 | 78.78 | 79.29 |
| 17 | 87.07 | 100 | 104.11 | 108.56 | 79.16 | 97.06 | 92.86 | 81.57 | 82.49 | 106.4 | 108.56 | 89.38 | 86.15 | 85.61 |
| 18 | 89.16 | 100 | 103.31 | 107.96 | 84.01 | 105.44 | 97.75 | 84.21 | 84.82 | 106.16 | 107.96 | 91.06 | 91.99 | 90.8 |
| 19 | 91.21 | 100 | 102.53 | 107.32 | 108.45 | 104.59 | 100.53 | 86.66 | 87.02 | 105.81 | 107.32 | 92.71 | 96.42 | 94.94 |
| 20 | 93.26 | 100 | 101.23 | 106.1 | 107.72 | 103.45 | 101.75 | 88.98 | 89.11 | 104.85 | 106.1 | 94.21 | 99.53 | 98 |
| 21 | 95.17 | 100 | 99.98 | 104.89 | 106.55 | 102.08 | 101.87 | 91.05 | 91 | 103.84 | 104.89 | 95.56 | 101.34 | 99.99 |
| 22 | 96.96 | 100 | 98.91 | 103.83 | 104.26 | 100.64 | 101.36 | 92.91 | 92.71 | 102.92 | 103.83 | 96.79 | 102.02 | 101.02 |
| 23 | 98.68 | 100 | 97.71 | 102.61 | 102.95 | 99.31 | 100.49 | 94.65 | 94.3 | 101.79 | 102.61 | 97.83 | 101.62 | 101.09 |
| 24 | 100.32 | 100 | 96.46 | 101.33 | 101.37 | 97.98 | 99.35 | 96.24 | 95.75 | 100.57 | 101.33 | 98.57 | 99.89 | 100 |
| 25 | 101.86 | 100 | 95.19 | 100 | 99.55 | 96.6 | 98.05 | 97.69 | 97.08 | 99.28 | 100 | 98.57 | 95.57 | 97.13 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET

EXPENSE TYPE:COMMS. 110% FOR 5,80% FOR 10,120% FOR 10

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 70.88 | 69.84 | 66.72 | 69.82 | 70.88 | 69.5 | 69.5 | 70.88 | 70.88 | 70.15 | 69.82 | 69.66 | 69.66 | 69.82 |
| 2 | 77.76 | 75.92 | 71.46 | 75.17 | 77.76 | 74.14 | 74.64 | 75.99 | 76.92 | 76.44 | 75.86 | 76.14 | 75.54 | 75.6 |
| 3 | 74.89 | 73.13 | 67.63 | 71.46 | 74.89 | 68.98 | 70.47 | 72.15 | 73.29 | 73.14 | 72.41 | 73.12 | 71.77 | 71.88 |
| 4 | 72.24 | 70.74 | 64.3 | 68.07 | 69.91 | 65.31 | 66.75 | 68.86 | 69.95 | 70.1 | 69.25 | 70.38 | 68.32 | 68.47 |
| 5 | 69.7 | 68.61 | 61.23 | 64.84 | 65.19 | 62.07 | 63.34 | 65.87 | 66.77 | 67.19 | 66.23 | 67.76 | 65.06 | 65.25 |
| 6 | 62.63 | 62.64 | 56.36 | 59.29 | 56.56 | 55.71 | 56.73 | 58.76 | 59.45 | 61.2 | 60.55 | 61.12 | 58.01 | 58.27 |
| 7 | 56.36 | 57.2 | 51.89 | 54.29 | 50.84 | 50.71 | 51.34 | 52.71 | 53.15 | 55.84 | 55.45 | 55.21 | 52.12 | 52.35 |
| 8 | 50.76 | 52.18 | 47.77 | 49.76 | 45.74 | 46.73 | 46.75 | 47.42 | 47.64 | 51.01 | 50.82 | 49.9 | 47.06 | 47.25 |
| 9 | 45.72 | 47.53 | 43.94 | 45.61 | 41.15 | 43.02 | 42.72 | 42.73 | 42.76 | 46.6 | 46.58 | 45.1 | 42.66 | 42.78 |
| 10 | 41.15 | 43.19 | 40.47 | 41.86 | 37.88 | 39.59 | 39.13 | 38.52 | 38.4 | 42.64 | 42.75 | 40.75 | 38.76 | 38.82 |
| 11 | 37.03 | 39.13 | 37.17 | 38.35 | 34.84 | 36.39 | 35.86 | 34.73 | 34.52 | 38.96 | 39.16 | 36.78 | 35.29 | 35.28 |
| 12 | 33.23 | 35.27 | 34.04 | 35.04 | 31.94 | 33.36 | 32.8 | 31.25 | 30.98 | 35.51 | 35.79 | 33.12 | 32.1 | 32.05 |
| 13 | 29.73 | 31.6 | 31.06 | 31.91 | 29.2 | 30.45 | 29.91 | 28.04 | 27.73 | 32.27 | 32.6 | 29.72 | 29.15 | 29.05 |
| 14 | 26.47 | 28.07 | 28.2 | 28.93 | 26.56 | 27.66 | 27.16 | 25.05 | 24.73 | 29.19 | 29.55 | 26.55 | 26.39 | 26.26 |
| 15 | 23.43 | 24.68 | 25.44 | 26.07 | 24 | 24.96 | 24.51 | 22.24 | 21.93 | 26.26 | 26.62 | 23.58 | 23.76 | 23.61 |
| 16 | 20.58 | 21.4 | 21.94 | 22.5 | 21.51 | 22.07 | 21.66 | 19.6 | 19.31 | 22.7 | 22.98 | 20.64 | 21.12 | 20.96 |
| 17 | 17.89 | 18.38 | 18.72 | 19.22 | 19.06 | 19.07 | 18.79 | 17.08 | 16.81 | 19.41 | 19.63 | 17.88 | 18.46 | 18.31 |
| 18 | 15.35 | 15.58 | 15.77 | 16.2 | 16.66 | 16.06 | 16 | 14.68 | 14.43 | 16.38 | 16.54 | 15.28 | 15.83 | 15.72 |
| 19 | 12.92 | 12.98 | 13.04 | 13.4 | 13.78 | 13.28 | 13.33 | 12.38 | 12.16 | 13.57 | 13.69 | 12.82 | 13.27 | 13.19 |
| 20 | 10.61 | 10.55 | 10.53 | 10.82 | 11.1 | 10.71 | 10.8 | 10.17 | 9.98 | 10.96 | 11.06 | 10.48 | 10.79 | 10.76 |
| 21 | 8.37 | 8.25 | 8.18 | 8.42 | 8.6 | 8.32 | 8.42 | 8.03 | 7.88 | 8.53 | 8.6 | 8.25 | 8.42 | 8.42 |
| 22 | 6.21 | 6.06 | 5.97 | 6.14 | 6.27 | 6.07 | 6.15 | 5.95 | 5.84 | 6.23 | 6.27 | 6.08 | 6.14 | 6.16 |
| 23 | 4.09 | 3.97 | 3.88 | 3.99 | 4.07 | 3.94 | 4 | 3.93 | 3.85 | 4.05 | 4.08 | 3.99 | 3.96 | 3.99 |
| 24 | 2.03 | 1.95 | 1.9 | 1.95 | 1.98 | 1.92 | 1.95 | 1.95 | 1.9 | 1.98 | 1.99 | 1.96 | 1.9 | 1.93 |
| 25 | | | | | | | | | | | | | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-ASSET-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 101.5 | 100 | 95.54 | 99.97 | 101.5 | 99.51 | 99.51 | 101.5 | 101.5 | 100.45 | 99.97 | 99.75 | 99.75 | 99.97 |
| 2 | 102.42 | 100 | 94.13 | 99 | 102.42 | 97.65 | 98.32 | 100.09 | 101.32 | 100.68 | 99.92 | 100.29 | 99.5 | 99.57 |
| 3 | 102.4 | 100 | 92.48 | 97.72 | 102.4 | 94.33 | 96.36 | 98.66 | 100.22 | 100.02 | 99.01 | 99.99 | 98.14 | 98.29 |
| 4 | 102.12 | 100 | 90.89 | 96.22 | 98.82 | 92.32 | 94.36 | 97.34 | 98.87 | 99.09 | 97.88 | 99.48 | 96.57 | 96.79 |
| 5 | 101.59 | 100 | 89.24 | 94.51 | 95.02 | 90.47 | 92.33 | 96.01 | 97.32 | 97.92 | 96.53 | 98.76 | 94.83 | 95.1 |
| 6 | 99.97 | 100 | 89.98 | 94.65 | 90.28 | 88.93 | 90.57 | 93.81 | 94.9 | 97.69 | 96.67 | 97.58 | 92.61 | 93.01 |
| 7 | 98.55 | 100 | 90.73 | 94.92 | 88.89 | 88.66 | 89.76 | 92.15 | 92.92 | 97.63 | 96.95 | 96.53 | 91.12 | 91.53 |
| 8 | 97.29 | 100 | 91.56 | 95.36 | 87.66 | 89.56 | 89.59 | 90.88 | 91.3 | 97.75 | 97.4 | 95.64 | 90.2 | 90.55 |
| 9 | 96.2 | 100 | 92.46 | 95.95 | 86.58 | 90.52 | 89.88 | 89.9 | 89.97 | 98.06 | 98 | 94.89 | 89.75 | 90.01 |
| 10 | 95.29 | 100 | 93.71 | 96.93 | 87.7 | 91.66 | 90.59 | 89.18 | 88.93 | 98.73 | 99 | 94.34 | 89.76 | 89.88 |
| 11 | 94.63 | 100 | 94.99 | 98 | 89.02 | 93 | 91.64 | 88.76 | 88.23 | 99.56 | 100.09 | 94 | 90.19 | 90.17 |
| 12 | 94.21 | 100 | 96.51 | 99.34 | 90.55 | 94.58 | 92.99 | 88.6 | 87.83 | 100.67 | 101.47 | 93.89 | 91.01 | 90.85 |
| 13 | 94.07 | 100 | 98.3 | 101 | 92.4 | 96.37 | 94.67 | 88.73 | 87.76 | 102.12 | 103.16 | 94.06 | 92.26 | 91.95 |
| 14 | 94.28 | 100 | 100.44 | 103.05 | 94.6 | 98.52 | 96.74 | 89.21 | 88.07 | 103.99 | 105.25 | 94.57 | 93.98 | 93.52 |
| 15 | 94.93 | 100 | 103.06 | 105.61 | 97.25 | 101.13 | 99.29 | 90.12 | 88.85 | 106.38 | 107.86 | 95.53 | 96.28 | 95.67 |
| 16 | 96.17 | 100 | 102.5 | 105.13 | 100.48 | 103.12 | 101.22 | 91.6 | 90.23 | 106.06 | 107.38 | 96.46 | 98.69 | 97.92 |
| 17 | 97.37 | 100 | 101.86 | 104.57 | 103.72 | 103.78 | 102.27 | 92.96 | 91.49 | 105.63 | 106.8 | 97.32 | 100.44 | 99.64 |
| 18 | 98.5 | 100 | 101.21 | 103.96 | 106.93 | 103.08 | 102.71 | 94.21 | 92.65 | 105.13 | 106.18 | 98.1 | 101.6 | 100.88 |
| 19 | 99.57 | 100 | 100.5 | 103.28 | 106.17 | 102.33 | 102.72 | 95.36 | 93.7 | 104.54 | 105.49 | 98.8 | 102.22 | 101.67 |
| 20 | 100.56 | 100 | 99.84 | 102.63 | 105.28 | 101.56 | 102.44 | 96.39 | 94.64 | 103.95 | 104.82 | 99.41 | 102.34 | 102.03 |
| 21 | 101.5 | 100 | 99.2 | 102 | 104.29 | 100.81 | 102 | 97.33 | 95.5 | 103.36 | 104.18 | 99.93 | 102.01 | 102 |
| 22 | 102.39 | 100 | 98.54 | 101.34 | 103.5 | 100.09 | 101.44 | 98.21 | 96.29 | 102.73 | 103.51 | 100.34 | 101.22 | 101.58 |
| 23 | 103.24 | 100 | 97.88 | 100.67 | 102.62 | 99.38 | 100.82 | 99.03 | 97.01 | 102.07 | 102.82 | 100.6 | 99.85 | 100.69 |
| 24 | 104.03 | 100 | 97.23 | 100 | 101.68 | 98.66 | 100.14 | 99.78 | 97.68 | 101.4 | 102.14 | 100.6 | 97.61 | 99.2 |
| 25 | 81.25 | 100 | 74.89 | 100 | 78.25 | 75.95 | 77.1 | 77.91 | 81.74 | 81.25 | 81.25 | 78.57 | | |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORTIZATION

EXPENSE TYPE:COMMS. 110% FOR 5,80% FOR 10,120% FOR 10

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 29.12 | 30.16 | 33.28 | 30.18 | 29.12 | 30.5 | 30.5 | 29.12 | 29.12 | 29.85 | 30.18 | 30.34 | 30.34 | 30.18 |
| 2 | -6.87 | -6.08 | -4.74 | -5.35 | -6.87 | -4.64 | -5.15 | -5.11 | -6.04 | -6.29 | -6.04 | -6.48 | -5.88 | -5.78 |
| 3 | 2.87 | 2.79 | 3.83 | 3.7 | 2.87 | 5.15 | 4.17 | 3.84 | 3.63 | 3.3 | 3.45 | 3.02 | 3.77 | 3.72 |
| 4 | 2.65 | 2.39 | 3.33 | 3.39 | 4.98 | 3.67 | 3.72 | 3.28 | 3.34 | 3.04 | 3.16 | 2.74 | 3.45 | 3.41 |
| 5 | 2.54 | 2.13 | 3.07 | 3.22 | 4.71 | 3.24 | 3.41 | 2.99 | 3.17 | 2.92 | 3.02 | 2.62 | 3.26 | 3.22 |
| 6 | 7.07 | 5.97 | 4.87 | 5.56 | 8.64 | 6.36 | 6.61 | 7.11 | 7.32 | 5.99 | 5.67 | 6.64 | 7.05 | 6.99 |
| 7 | 6.26 | 5.45 | 4.47 | 5 | 5.71 | 4.99 | 5.39 | 6.06 | 6.3 | 5.36 | 5.1 | 5.91 | 5.9 | 5.91 |
| 8 | 5.6 | 5.02 | 4.12 | 4.53 | 5.11 | 3.98 | 4.59 | 5.29 | 5.51 | 4.83 | 4.63 | 5.31 | 5.05 | 5.1 |
| 9 | 5.04 | 4.65 | 3.83 | 4.15 | 4.59 | 3.71 | 4.03 | 4.69 | 4.87 | 4.4 | 4.24 | 4.8 | 4.41 | 4.47 |
| 10 | 4.57 | 4.34 | 3.47 | 3.75 | 3.27 | 3.44 | 3.59 | 4.21 | 4.36 | 3.96 | 3.83 | 4.36 | 3.89 | 3.96 |
| 11 | 4.13 | 4.06 | 3.3 | 3.51 | 3.04 | 3.19 | 3.27 | 3.78 | 3.88 | 3.68 | 3.59 | 3.96 | 3.47 | 3.53 |
| 12 | 3.8 | 3.86 | 3.13 | 3.3 | 2.9 | 3.03 | 3.06 | 3.48 | 3.54 | 3.44 | 3.37 | 3.66 | 3.19 | 3.24 |
| 13 | 3.51 | 3.68 | 2.98 | 3.13 | 2.74 | 2.91 | 2.89 | 3.22 | 3.25 | 3.24 | 3.2 | 3.4 | 2.95 | 2.99 |
| 14 | 3.26 | 3.52 | 2.86 | 2.98 | 2.64 | 2.79 | 2.76 | 2.99 | 3 | 3.07 | 3.05 | 3.17 | 2.77 | 2.8 |
| 15 | 3.04 | 3.39 | 2.76 | 2.86 | 2.55 | 2.7 | 2.65 | 2.8 | 2.8 | 2.94 | 2.92 | 2.97 | 2.62 | 2.64 |
| 16 | 2.85 | 3.28 | 3.5 | 3.57 | 2.5 | 2.89 | 2.84 | 2.64 | 2.62 | 3.56 | 3.64 | 2.93 | 2.64 | 2.66 |
| 17 | 2.69 | 3.03 | 3.22 | 3.28 | 2.45 | 3 | 2.87 | 2.52 | 2.5 | 3.29 | 3.36 | 2.76 | 2.66 | 2.65 |
| 18 | 2.55 | 2.8 | 2.95 | 3.02 | 2.4 | 3.01 | 2.79 | 2.41 | 2.38 | 3.03 | 3.08 | 2.6 | 2.63 | 2.59 |
| 19 | 2.42 | 2.6 | 2.72 | 2.79 | 2.88 | 2.78 | 2.67 | 2.3 | 2.27 | 2.81 | 2.85 | 2.46 | 2.56 | 2.52 |
| 20 | 2.32 | 2.43 | 2.51 | 2.58 | 2.67 | 2.57 | 2.53 | 2.21 | 2.18 | 2.6 | 2.63 | 2.34 | 2.47 | 2.43 |
| 21 | 2.23 | 2.3 | 2.35 | 2.41 | 2.5 | 2.39 | 2.39 | 2.14 | 2.1 | 2.44 | 2.46 | 2.24 | 2.38 | 2.35 |
| 22 | 2.17 | 2.19 | 2.21 | 2.27 | 2.33 | 2.25 | 2.27 | 2.08 | 2.04 | 2.3 | 2.32 | 2.16 | 2.28 | 2.26 |
| 23 | 2.11 | 2.1 | 2.09 | 2.15 | 2.2 | 2.13 | 2.15 | 2.03 | 1.99 | 2.18 | 2.2 | 2.09 | 2.17 | 2.16 |
| 24 | 2.07 | 2.02 | 1.99 | 2.04 | 2.09 | 2.02 | 2.05 | 1.98 | 1.94 | 2.07 | 2.09 | 2.03 | 2.06 | 2.06 |
| 25 | 2.03 | 1.95 | 1.9 | 1.95 | 1.98 | 1.92 | 1.95 | 1.95 | 1.9 | 1.98 | 1.99 | 1.96 | 1.9 | 1.93 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS-AMORT-PERCENT OF STATIC

| YEAR | | | DYNAMIC METHODS AMORTIZATION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| 1 | 96.54 | 100 | 110.34 | 100.07 | 96.54 | 101.14 | 101.14 | 96.54 | 96.54 | 98.96 | 100.07 | 100.58 | 100.58 | 100.07 |
| 2 | 112.98 | 100 | 77.94 | 87.9 | 112.98 | 76.28 | 84.62 | 83.97 | 99.29 | 103.32 | 99.3 | 106.47 | 96.6 | 94.97 |
| 3 | 102.77 | 100 | 137.27 | 132.66 | 102.77 | 184.64 | 149.51 | 137.66 | 130.19 | 118.07 | 123.57 | 108.14 | 134.98 | 133.09 |
| 4 | 110.86 | 100 | 139.53 | 142.22 | 208.66 | 153.79 | 155.73 | 137.63 | 140.15 | 127.31 | 132.47 | 115.02 | 144.57 | 142.7 |
| 5 | 119.21 | 100 | 143.87 | 151.03 | 220.85 | 151.91 | 159.7 | 140.15 | 148.74 | 136.74 | 141.46 | 122.59 | 152.67 | 151.05 |
| 6 | 118.51 | 100 | 81.55 | 93.1 | 144.76 | 106.62 | 110.8 | 119.15 | 122.73 | 100.39 | 95.09 | 111.2 | 118.11 | 117.06 |
| 7 | 114.98 | 100 | 82.09 | 91.75 | 104.9 | 91.72 | 99.07 | 111.2 | 115.64 | 98.35 | 93.71 | 108.52 | 108.3 | 108.56 |
| 8 | 111.64 | 100 | 82.09 | 90.31 | 101.75 | 79.33 | 91.46 | 105.41 | 109.84 | 96.3 | 92.24 | 105.85 | 100.69 | 101.71 |
| 9 | 108.38 | 100 | 82.34 | 89.34 | 98.66 | 79.74 | 86.63 | 100.83 | 104.81 | 94.67 | 91.25 | 103.27 | 94.74 | 96.12 |
| 10 | 105.23 | 100 | 79.99 | 86.28 | 75.39 | 79.19 | 82.8 | 97.07 | 100.41 | 91.32 | 88.12 | 100.34 | 89.72 | 91.22 |
| 11 | 101.67 | 100 | 81.36 | 86.59 | 74.98 | 78.71 | 80.49 | 93.26 | 95.68 | 90.81 | 88.44 | 97.67 | 85.6 | 87.09 |
| 12 | 98.49 | 100 | 81.12 | 85.67 | 75.09 | 78.61 | 79.28 | 90.23 | 91.88 | 89.33 | 87.5 | 95.01 | 82.63 | 83.96 |
| 13 | 95.38 | 100 | 81.13 | 85.09 | 74.61 | 79.18 | 78.56 | 87.45 | 88.39 | 88.2 | 86.9 | 92.44 | 80.3 | 81.42 |
| 14 | 92.4 | 100 | 81.21 | 84.68 | 74.9 | 79.25 | 78.22 | 84.92 | 85.25 | 87.29 | 86.49 | 89.97 | 78.54 | 79.43 |
| 15 | 89.55 | 100 | 81.38 | 84.44 | 75.27 | 79.47 | 78.15 | 82.6 | 82.42 | 86.58 | 86.24 | 87.6 | 77.26 | 77.9 |
| 16 | 86.84 | 100 | 106.78 | 108.73 | 76.16 | 88.16 | 86.68 | 80.46 | 79.87 | 108.46 | 111.05 | 89.47 | 80.54 | 80.98 |
| 17 | 88.93 | 100 | 106.34 | 108.56 | 80.85 | 99.13 | 94.85 | 83.31 | 82.55 | 108.68 | 110.88 | 91.23 | 88.06 | 87.44 |
| 18 | 91.06 | 100 | 105.52 | 107.96 | 85.8 | 107.69 | 99.84 | 86.01 | 85.07 | 108.42 | 110.27 | 92.95 | 94 | 92.74 |
| 19 | 93.16 | 100 | 104.72 | 107.32 | 110.77 | 106.82 | 102.67 | 88.52 | 87.41 | 108.07 | 109.61 | 94.63 | 98.52 | 96.97 |
| 20 | 95.25 | 100 | 103.39 | 106.1 | 110.02 | 105.66 | 103.92 | 90.88 | 89.6 | 107.09 | 108.37 | 96.16 | 101.68 | 100.1 |
| 21 | 97.2 | 100 | 102.12 | 104.89 | 108.83 | 104.26 | 104.04 | 92.99 | 91.56 | 106.06 | 107.13 | 97.54 | 103.52 | 102.12 |
| 22 | 99.03 | 100 | 101.02 | 103.83 | 106.49 | 102.79 | 103.53 | 94.9 | 93.31 | 105.11 | 106.05 | 98.79 | 104.21 | 103.18 |
| 23 | 100.79 | 100 | 99.79 | 102.61 | 105.14 | 101.43 | 102.63 | 96.67 | 94.92 | 103.97 | 104.8 | 99.86 | 103.8 | 103.25 |
| 24 | 102.46 | 100 | 98.52 | 101.33 | 103.54 | 100.07 | 101.47 | 98.3 | 96.37 | 102.72 | 103.49 | 100.6 | 102.02 | 102.14 |
| 25 | 104.03 | 100 | 97.23 | 100 | 101.68 | 98.66 | 100.14 | 99.78 | 97.68 | 101.4 | 102.14 | 100.6 | 97.61 | 99.2 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC
METHODS COMPARED TO EPHS
110% FOR 5,80% FOR 10,120% FOR 10
(NON-RESERVE STATISTICS HAVE BEEN MULTIPLIED BY 10)

| | | | | DYNAMIC METHODS ASSET | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOB STATIC | FORMULA | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| OTHER-EPHS-ASSET | -DIFF | -160 | 0 | -507 | -113 | -374 | -471 | -448 | -463 | -360 | -95 | -113 | -263 | -430 | -417 |
| | -ABS(DIFF) | 237 | 0 | 512 | 205 | 474 | 481 | 451 | 490 | 401 | 165 | 205 | 266 | 433 | 420 |
| | -DIFF*2 | 368 | 0 | 2253 | 331 | 1850 | 2061 | 1729 | 1525 | 1044 | 219 | 331 | 488 | 1495 | 1379 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 70 | 0 | 134 | 78 | 146 | 125 | 106 | 111 | 97 | 67 | 78 | 51 | 96 | 90 |
| | -DIFF*2 | 40 | 0 | 185 | 37 | 190 | 128 | 84 | 91 | 63 | 29 | 37 | 16 | 64 | 57 |
| COMMS-EPHS-ASSET | -DIFF | -88 | 0 | -512 | -157 | -385 | -488 | -461 | -499 | -476 | 14 | -6 | -226 | -433 | -427 |
| | -ABS(DIFF) | 243 | 0 | 552 | 279 | 556 | 541 | 501 | 521 | 520 | 168 | 219 | 231 | 455 | 444 |
| | -DIFF*2 | 383 | 0 | 2698 | 617 | 2485 | 2599 | 2120 | 1854 | 1817 | 176 | 319 | 424 | 1719 | 1632 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 82 | 0 | 165 | 103 | 187 | 153 | 127 | 117 | 117 | 71 | 86 | 57 | 109 | 103 |
| | -DIFF*2 | 50 | 0 | 213 | 65 | 291 | 171 | 111 | 85 | 87 | 29 | 42 | 21 | 81 | 74 |
| OTHER-EPHS | -BENEFIT RES DIF | -6 | 0 | 12 | 15 | 8 | 16 | 16 | 6 | 2 | 18 | 15 | 6 | 10 | 6 |
| | RESERVE INC DIF | -7 | 0 | 19 | 20 | 11 | 17 | 17 | 1 | -3 | 21 | 20 | -1 | 9 | 5 |
| COMMS-EPHS | -BENEFIT RES DIF | -4 | 0 | 20 | 17 | 8 | 20 | 14 | 4 | 2 | 8 | 12 | 0 | 16 | 12 |
| | RESERVE INC DIF | -9 | 0 | 23 | 22 | 5 | 17 | 13 | -1 | -3 | 15 | 21 | -7 | 9 | 9 |

APPENDIX 2—*Continued*

DYNAMIC METHOD COMPARISON TESTS

RANK OF STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
110% FOR 5, 80% FOR 10, 120% FOR 10

| LOB | STATIC | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | EPHS-ASSET | 12 | 3 | 9.9 | 10.9 | 8.9 | 8.3 | 5 | 1 | 2 | 4 | 7 | 6 |
| | -AMORT | 11 | 3.9 | 12 | 10 | 8 | 9 | 6.1 | 2 | 3.1 | 1 | 6.9 | 5 |
| COMMS | EPHS-ASSET | 11.9 | 4 | 10.2 | 10.9 | 8.8 | 8.1 | 7.1 | 1 | 2 | 3 | 6 | 5 |
| | -AMORT | 11 | 4 | 12 | 10 | 9 | 7.1 | 7.9 | 2 | 3 | 1 | 6 | 5 |

APPENDIX 3

RESULTS OF MONTE CARLO SIMULATIONS

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 1

| | STATIC | ---THEORETICAL---- | | | | | |
|---|---|---|---|---|---|---|---|
| | LAPSE | | SAMPLE | ******SAMPLE****** | | LOWEST | HIGHEST |
| YEAR | ASSUMP | MEAN | STD DEV | MEAN | STD DEV | VALUE | VALUE |
| 1 | 37.0 | 37.00 | 4.26 | 36.27 | 4.20 | 30.0 | 44.0 |
| 2 | 19.1 | 19.10 | 3.95 | 18.94 | 3.95 | 12.3 | 25.9 |
| 3 | 14.8 | 14.80 | 3.97 | 14.46 | 3.95 | 7.9 | 21.6 |
| 4 | 12.6 | 12.60 | 3.96 | 13.01 | 3.94 | 5.8 | 19.3 |
| 5 | 11.5 | 11.50 | 3.97 | 11.27 | 3.96 | 4.6 | 18.4 |
| 6 | 10.9 | 10.90 | 4.02 | 10.71 | 4.01 | 4.0 | 17.7 |
| 7 | 10.3 | 10.30 | 4.17 | 10.25 | 4.17 | 3.5 | 17.0 |
| 8 | 10.0 | 10.00 | 3.51 | 10.43 | 3.48 | 3.4 | 16.8 |
| 9 | 9.6 | 9.60 | 4.11 | 8.88 | 4.05 | 2.7 | 16.5 |
| 10 | 10.4 | 10.40 | 3.97 | 9.81 | 3.93 | 4.0 | 17.3 |
| 11 | 9.4 | 9.40 | 3.87 | 9.28 | 3.87 | 2.5 | 16.4 |
| 12 | 9.3 | 9.30 | 4.09 | 9.34 | 4.09 | 2.5 | 16.1 |
| 13 | 9.1 | 9.10 | 3.99 | 9.11 | 3.99 | 2.1 | 16.0 |
| 14 | 8.9 | 8.95 | 3.97 | 9.29 | 3.96 | 2.1 | 15.9 |
| 15 | 8.7 | 8.85 | 4.07 | 8.88 | 4.07 | 2.0 | 15.6 |
| 16 | 8.4 | 8.70 | 3.83 | 8.26 | 3.81 | 2.2 | 15.3 |
| 17 | 8.4 | 8.70 | 3.83 | 8.68 | 3.83 | 2.2 | 15.2 |
| 18 | 8.2 | 8.60 | 3.89 | 8.29 | 3.88 | 2.0 | 15.2 |
| 19 | 8.1 | 8.55 | 3.67 | 9.00 | 3.65 | 2.2 | 15.0 |
| 20 | 7.6 | 8.30 | 3.54 | 7.88 | 3.52 | 2.3 | 14.4 |
| 21 | 7.2 | 8.10 | 3.71 | 7.79 | 3.70 | 2.0 | 14.2 |
| 22 | 7.1 | 8.05 | 3.60 | 7.85 | 3.60 | 2.0 | 14.1 |
| 23 | 6.9 | 7.95 | 3.26 | 8.01 | 3.26 | 2.3 | 13.8 |
| 24 | 6.7 | 7.85 | 3.32 | 7.71 | 3.32 | 2.1 | 13.6 |
| 25 | 6.4 | 7.70 | 3.32 | 7.45 | 3.31 | 2.1 | 13.2 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
SUMMARY OF SIMULATION 1

| LOB | STATIC FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET: FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS-ASSET | -DIFF | 38 | 0 | 1214 | 216 | 865 | 1096 | 1002 | 644 | 462 | 87 | 216 | 111 | 768 | 715 |
| | -ABS(DIFF) | 4427 | 0 | 4420 | 2191 | 4055 | 3988 | 3612 | 3887 | 3848 | 2352 | 2191 | 3523 | 3390 | 3310 |
| | -DIFF*2 | 14641 | 0 | 17460 | 4323 | 13340 | 13517 | 10544 | 11311 | 10934 | 4899 | 4323 | 9401 | 9098 | 8610 |
| | -AMORT-DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 845 | 0 | 2540 | 1562 | 1587 | 1506 | 1140 | 1085 | 940 | 1306 | 1562 | 671 | 986 | 923 |
| | -DIFF*2 | 731 | 0 | 6461 | 1848 | 2194 | 2042 | 1154 | 1375 | 894 | 1256 | 1848 | 430 | 829 | 733 |
| COMMS-EPHS-ASSET | -DIFF | -236 | 0 | 1296 | 300 | 911 | 1177 | 1056 | 585 | 579 | -178 | -6 | -123 | 736 | 679 |
| | -ABS(DIFF) | 6527 | 0 | 4920 | 3029 | 5105 | 4563 | 4147 | 5046 | 5147 | 3623 | 3256 | 5184 | 4092 | 4070 |
| | -DIFF*2 | 33046 | 0 | 21628 | 8283 | 21609 | 17836 | 14171 | 19046 | 19680 | 12135 | 9892 | 20877 | 13521 | 13263 |
| | -AMORT-DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 1170 | 0 | 3194 | 2125 | 2099 | 1881 | 1417 | 1238 | 1220 | 1822 | 2156 | 965 | 1216 | 1152 |
| | -DIFF*2 | 1215 | 0 | 9084 | 3386 | 3634 | 3008 | 1702 | 1426 | 1298 | 2421 | 3493 | 858 | 1218 | 1108 |
| OTHER-EPHS | -BENEFIT RES DIF | -254 | 0 | 1916 | 1026 | 960 | 1604 | 1522 | 460 | 300 | 424 | 1026 | 4 | 1252 | 1142 |
| | RESERVE INC DIF | -356 | 0 | 2150 | 2134 | -38 | 784 | 1024 | -188 | -176 | 1898 | 2134 | 548 | 550 | 600 |
| COMMS-EPHS | -BENEFIT RES DIF | -372 | 0 | 2152 | 1032 | 866 | 1606 | 1486 | 290 | 356 | 80 | 486 | -146 | 1108 | 1044 |
| | RESERVE INC DIF | -350 | 0 | 2226 | 2124 | -24 | 816 | 1084 | -202 | -164 | 1760 | 1930 | 460 | 540 | 580 |

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 2

| YEAR | STATIC LAPSE ASSUMP | ---THEORETICAL---- MEAN | SAMPLE STD DEV | ******SAMPLE****** MEAN | STD DEV | LOWEST VALUE | HIGHEST VALUE |
|---|---|---|---|---|---|---|---|
| 1 | 37.0 | 37.00 | 2.21 | 37.15 | 2.20 | 33.3 | 40.7 |
| 2 | 19.1 | 19.10 | 1.15 | 19.13 | 1.15 | 17.1 | 21.0 |
| 3 | 14.8 | 14.80 | 1.06 | 14.88 | 1.06 | 12.9 | 16.8 |
| 4 | 12.6 | 12.60 | 1.21 | 12.53 | 1.21 | 10.6 | 14.5 |
| 5 | 11.5 | 11.50 | 1.08 | 11.46 | 1.08 | 9.5 | 13.4 |
| 6 | 10.9 | 10.90 | 1.09 | 10.92 | 1.09 | 8.9 | 12.9 |
| 7 | 10.3 | 10.30 | 1.15 | 10.30 | 1.15 | 8.3 | 12.3 |
| 8 | 10.0 | 10.00 | 1.17 | 10.08 | 1.17 | 8.0 | 12.0 |
| 9 | 9.6 | 9.60 | 1.09 | 9.52 | 1.09 | 7.7 | 11.6 |
| 10 | 10.4 | 10.40 | 1.13 | 10.38 | 1.13 | 8.5 | 12.4 |
| 11 | 9.4 | 9.40 | 1.08 | 9.36 | 1.08 | 7.4 | 11.4 |
| 12 | 9.3 | 9.30 | 1.13 | 9.28 | 1.13 | 7.4 | 11.3 |
| 13 | 9.1 | 9.10 | 1.15 | 8.96 | 1.14 | 7.1 | 11.1 |
| 14 | 8.9 | 8.90 | 1.19 | 9.03 | 1.18 | 6.9 | 10.9 |
| 15 | 8.7 | 8.70 | 1.12 | 8.91 | 1.10 | 6.7 | 10.7 |
| 16 | 8.4 | 8.40 | 1.19 | 8.44 | 1.19 | 6.4 | 10.4 |
| 17 | 8.4 | 8.40 | 1.16 | 8.50 | 1.15 | 6.4 | 10.4 |
| 18 | 8.2 | 8.20 | 1.17 | 8.21 | 1.17 | 6.2 | 10.2 |
| 19 | 8.1 | 8.10 | 1.11 | 7.96 | 1.10 | 6.1 | 10.1 |
| 20 | 7.6 | 7.60 | 1.09 | 7.37 | 1.06 | 5.6 | 9.5 |
| 21 | 7.2 | 7.20 | 1.18 | 7.12 | 1.18 | 5.2 | 9.1 |
| 22 | 7.1 | 7.10 | 1.15 | 7.13 | 1.15 | 5.1 | 9.0 |
| 23 | 6.9 | 6.90 | 1.14 | 6.91 | 1.14 | 4.9 | 8.9 |
| 24 | 6.7 | 6.70 | 1.19 | 6.78 | 1.19 | 4.7 | 8.7 |
| 25 | 6.4 | 6.40 | 1.21 | 6.44 | 1.21 | 4.4 | 8.3 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
SUMMARY OF SIMULATION 2

| LOB | STATIC FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET: FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS-ASSET | -DIFF | 78 | 0 | -112 | 2 | -51 | -90 | -75 | -33 | 3 | 19 | 2 | 7 | -65 | -59 |
| | -ABS(DIFF) | 1354 | 0 | 1885 | 670 | 1555 | 1661 | 1490 | 1391 | 1269 | 708 | 670 | 1035 | 1329 | 1269 |
| | -DIFF*2 | 1359 | 0 | 3215 | 402 | 2043 | 2448 | 1880 | 1582 | 1242 | 435 | 402 | 837 | 1496 | 1360 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 282 | 0 | 823 | 449 | 555 | 501 | 376 | 403 | 336 | 380 | 449 | 201 | 328 | 306 |
| | -DIFF*2 | 99 | 0 | 844 | 149 | 313 | 252 | 130 | 234 | 130 | 107 | 149 | 37 | 94 | 80 |
| COMMS-EPHS-ASSET | -DIFF | 150 | 0 | -92 | 4 | -29 | -72 | -52 | 1 | 6 | 73 | 52 | 51 | -39 | -32 |
| | -ABS(DIFF) | 2117 | 0 | 1902 | 923 | 1827 | 1711 | 1517 | 1606 | 1695 | 1196 | 1047 | 1523 | 1389 | 1363 |
| | -DIFF*2 | 3396 | 0 | 3296 | 762 | 2835 | 2659 | 2015 | 2048 | 2179 | 1255 | 974 | 1798 | 1665 | 1589 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 400 | 0 | 990 | 607 | 720 | 587 | 437 | 416 | 410 | 537 | 625 | 303 | 380 | 363 |
| | -DIFF*2 | 151 | 0 | 964 | 270 | 489 | 313 | 161 | 176 | 153 | 214 | 293 | 85 | 114 | 104 |
| OTHER-EPHS-BENEFIT RES DIF | | -452 | 0 | 1844 | 892 | 1052 | 1700 | 1642 | 626 | 354 | 226 | 892 | 58 | 1400 | 1340 |
| RESERVE INC DIF | | -416 | 0 | 2040 | 2094 | 4 | 802 | 952 | -158 | -196 | 1852 | 2094 | 526 | 564 | 538 |
| COMMS-EPHS-BENEFIT RES DIF | | -738 | 0 | 2118 | 894 | 940 | 1744 | 1658 | 298 | 348 | -440 | -14 | -298 | 1244 | 1092 |
| RESERVE INC DIF | | -398 | 0 | 2196 | 2088 | -6 | 842 | 1048 | -232 | -174 | 1614 | 1820 | 366 | 570 | 600 |

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 3

| YEAR | STATIC LAPSE ASSUMP | ---THEORETICAL---- MEAN | SAMPLE STD DEV | ******SAMPLE****** MEAN | STD DEV | LOWEST VALUE | HIGHEST VALUE |
|---|---|---|---|---|---|---|---|
| 1 | 37.0 | 37.00 | 1.08 | 36.97 | 1.08 | 35.2 | 38.8 |
| 2 | 19.1 | 19.10 | 1.13 | 18.99 | 1.13 | 17.1 | 21.9 |
| 3 | 14.8 | 14.80 | 1.20 | 14.74 | 1.19 | 12.1 | 18.1 |
| 4 | 12.6 | 12.60 | 1.25 | 12.55 | 1.25 | 9.8 | 15.8 |
| 5 | 11.5 | 11.50 | 1.25 | 11.47 | 1.25 | 8.5 | 14.9 |
| 6 | 10.9 | 10.90 | 1.27 | 10.88 | 1.27 | 8.1 | 14.6 |
| 7 | 10.3 | 10.30 | 1.27 | 10.24 | 1.27 | 7.5 | 13.5 |
| 8 | 10.0 | 10.00 | 1.28 | 9.96 | 1.28 | 7.1 | 13.5 |
| 9 | 9.6 | 9.60 | 1.33 | 9.63 | 1.33 | 6.7 | 13.4 |
| 10 | 10.4 | 10.40 | 1.34 | 10.39 | 1.34 | 7.5 | 14.0 |
| 11 | 9.4 | 9.40 | 1.31 | 9.35 | 1.31 | 6.3 | 13.1 |
| 12 | 9.3 | 9.30 | 1.31 | 9.25 | 1.31 | 6.2 | 12.5 |
| 13 | 9.1 | 9.10 | 1.34 | 9.03 | 1.34 | 6.3 | 12.1 |
| 14 | 8.9 | 8.90 | 1.37 | 8.80 | 1.36 | 5.8 | 12.0 |
| 15 | 8.7 | 8.70 | 1.40 | 8.59 | 1.40 | 5.5 | 11.8 |
| 16 | 8.4 | 8.40 | 1.46 | 8.31 | 1.45 | 5.1 | 11.9 |
| 17 | 8.4 | 8.40 | 1.51 | 8.33 | 1.51 | 5.4 | 12.1 |
| 18 | 8.2 | 8.20 | 1.53 | 8.10 | 1.52 | 4.7 | 12.2 |
| 19 | 8.1 | 8.10 | 1.53 | 7.99 | 1.53 | 4.6 | 11.9 |
| 20 | 7.6 | 7.60 | 1.58 | 7.53 | 1.57 | 4.5 | 11.7 |
| 21 | 7.2 | 7.20 | 1.64 | 7.16 | 1.64 | 3.6 | 11.6 |
| 22 | 7.1 | 7.10 | 1.66 | 7.04 | 1.66 | 3.5 | 11.8 |
| 23 | 6.9 | 6.90 | 1.69 | 6.88 | 1.69 | 3.0 | 11.6 |
| 24 | 6.7 | 6.70 | 1.70 | 6.67 | 1.70 | 2.5 | 11.4 |
| 25 | 6.4 | 6.40 | 1.73 | 6.34 | 1.73 | 1.9 | 11.6 |

APPENDIX 3—*Continued*
DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC
METHODS COMPARED TO EPHS
SUMMARY OF SIMULATION 3

| LOB | STATIC FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS | -ASSET-DIFF | -711 | 0 | 74 | -354 | -244 | -44 | -119 | -540 | -571 | -481 | -354 | -656 | -259 | -294 |
| | -ABS(DIFF) | 5770 | 0 | 1488 | 2310 | 2705 | 1760 | 1991 | 4242 | 4572 | 2963 | 2310 | 4755 | 2591 | 2754 |
| | -DIFF*2 | 23254 | 0 | 1756 | 4718 | 6375 | 2587 | 3350 | 12650 | 14983 | 7215 | 4718 | 16054 | 5613 | 6272 |
| | -AMORT-DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 735 | 0 | 341 | 426 | 636 | 417 | 412 | 561 | 626 | 481 | 426 | 607 | 479 | 484 |
| | -DIFF*2 | 527 | 0 | 118 | 248 | 486 | 223 | 215 | 381 | 430 | 295 | 248 | 359 | 268 | 273 |
| COMMS-EPHS | -ASSET-DIFF | -1075 | 0 | 5 | -512 | -425 | -153 | -256 | -838 | -809 | -757 | -581 | -1005 | -454 | -497 |
| | -ABS(DIFF) | 8353 | 0 | 1973 | 3200 | 3932 | 2514 | 2936 | 6210 | 6062 | 4461 | 3550 | 6987 | 3889 | 4093 |
| | -DIFF*2 | 49192 | 0 | 3234 | 9076 | 13617 | 5481 | 7458 | 27327 | 26858 | 16416 | 11059 | 34953 | 12916 | 14032 |
| | -AMORT-DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 1083 | 0 | 473 | 590 | 880 | 580 | 598 | 822 | 868 | 730 | 646 | 910 | 724 | 722 |
| | -DIFF*2 | 1051 | 0 | 233 | 451 | 878 | 417 | 429 | 704 | 761 | 596 | 505 | 756 | 555 | 556 |
| OTHER-EPHS | -BENEFIT RES DIF | 310 | 0 | 1834 | 748 | 1426 | 2092 | 1808 | 532 | 486 | 466 | 748 | 396 | 1462 | 1276 |
| | RESERVE INC DIF | 692 | 0 | 1418 | 1204 | 1128 | 1512 | 1550 | 886 | 816 | 1020 | 1204 | 814 | 1374 | 1284 |
| COMMS-EPHS | -BENEFIT RES DIF | 282 | 0 | 2112 | 750 | 1258 | 2008 | 1626 | 498 | 550 | 392 | 566 | 356 | 1308 | 1130 |
| | RESERVE INC DIF | 674 | 0 | 1562 | 1192 | 1100 | 1560 | 1460 | 842 | 834 | 874 | 980 | 778 | 1232 | 1182 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 4

| YEAR | STATIC LAPSE ASSUMP | ---THEORETICAL---- MEAN | SAMPLE STD DEV | ******SAMPLE****** MEAN | STD DEV | LOWEST VALUE | HIGHEST VALUE |
|---|---|---|---|---|---|---|---|
| 1 | 37.0 | 40.00 | 1.80 | 40.00 | 1.80 | 37.0 | 42.9 |
| 2 | 19.1 | 22.10 | 1.71 | 22.38 | 1.69 | 19.2 | 25.1 |
| 3 | 14.8 | 17.80 | 1.69 | 17.67 | 1.68 | 14.8 | 20.5 |
| 4 | 12.6 | 15.60 | 1.67 | 15.53 | 1.67 | 12.7 | 18.5 |
| 5 | 11.5 | 14.50 | 1.73 | 15.05 | 1.64 | 11.5 | 17.5 |
| 6 | 10.9 | 13.90 | 1.70 | 14.11 | 1.69 | 11.0 | 16.8 |
| 7 | 10.3 | 13.30 | 1.62 | 13.31 | 1.62 | 10.3 | 16.3 |
| 8 | 10.0 | 13.00 | 1.67 | 13.06 | 1.67 | 10.0 | 16.0 |
| 9 | 9.6 | 12.60 | 1.65 | 12.87 | 1.63 | 9.6 | 15.6 |
| 10 | 10.4 | 13.40 | 1.68 | 13.63 | 1.67 | 10.7 | 16.4 |
| 11 | 9.4 | 12.40 | 1.78 | 12.31 | 1.78 | 9.4 | 15.4 |
| 12 | 9.3 | 12.30 | 1.64 | 12.21 | 1.64 | 9.3 | 15.3 |
| 13 | 9.1 | 12.10 | 1.80 | 12.15 | 1.80 | 9.1 | 15.1 |
| 14 | 8.9 | 11.90 | 1.65 | 12.01 | 1.65 | 9.1 | 14.9 |
| 15 | 8.7 | 11.70 | 1.66 | 11.65 | 1.66 | 8.7 | 14.5 |
| 16 | 8.4 | 11.40 | 1.83 | 11.25 | 1.82 | 8.5 | 14.4 |
| 17 | 8.4 | 11.40 | 1.73 | 11.28 | 1.73 | 8.4 | 14.3 |
| 18 | 8.2 | 11.20 | 1.67 | 11.46 | 1.65 | 8.4 | 14.2 |
| 19 | 8.1 | 11.10 | 1.70 | 11.20 | 1.69 | 8.2 | 14.1 |
| 20 | 7.6 | 10.60 | 1.65 | 10.54 | 1.65 | 7.9 | 13.5 |
| 21 | 7.2 | 10.20 | 1.80 | 10.50 | 1.78 | 7.2 | 13.1 |
| 22 | 7.1 | 10.10 | 1.70 | 10.04 | 1.70 | 7.3 | 13.0 |
| 23 | 6.9 | 9.90 | 1.73 | 9.76 | 1.72 | 6.9 | 12.8 |
| 24 | 6.7 | 9.70 | 1.74 | 9.89 | 1.73 | 6.7 | 12.7 |
| 25 | 6.4 | 9.40 | 1.82 | 9.15 | 1.80 | 6.5 | 12.2 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
SUMMARY OF SIMULATION 4

| LOB | STATIC | FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| OTHER | EPHS | ASSET-DIFF | 15331 | 0 | -311 | 5164 | 5226 | 1648 | 3005 | 10016 | 11280 | 6940 | 5164 | 11859 | 5111 | 5738 |
| | | -ABS(DIFF) | 15331 | 0 | 1649 | 5164 | 5346 | 2329 | 3244 | 10016 | 11280 | 6940 | 5164 | 11859 | 5199 | 5776 |
| | | -DIFF*2 | 99999 | 0 | 2246 | 19006 | 26669 | 5599 | 9508 | 51226 | 67869 | 30773 | 19006 | 71535 | 19926 | 23359 |
| | | -AMORT-DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 1937 | 0 | 877 | 1133 | 1611 | 882 | 848 | 1328 | 1579 | 1274 | 1133 | 1529 | 1057 | 1097 |
| | | -DIFF*2 | 3347 | 0 | 888 | 1704 | 3424 | 1335 | 1233 | 2467 | 2788 | 2008 | 1704 | 2028 | 1545 | 1582 |
| COMMS | EPHS | ASSET-DIFF | 22122 | 0 | 954 | 6975 | 8080 | 3404 | 5246 | 14832 | 14386 | 10587 | 8174 | 17497 | 8272 | 8965 |
| | | -ABS(DIFF) | 22122 | 0 | 2153 | 6975 | 8142 | 3834 | 5378 | 14832 | 14386 | 10587 | 8174 | 17497 | 8343 | 8991 |
| | | -DIFF*2 | 99999 | 0 | 4556 | 34615 | 57804 | 14323 | 24510 | 99999 | 99999 | 71486 | 46552 | 99999 | 50228 | 55420 |
| | | -AMORT-DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 2895 | 0 | 1159 | 1525 | 2232 | 1217 | 1293 | 2002 | 2185 | 1938 | 1711 | 2342 | 1694 | 1709 |
| | | -DIFF*2 | 6318 | 0 | 1503 | 2902 | 5832 | 2323 | 2363 | 4058 | 4561 | 3857 | 3320 | 4156 | 3069 | 3099 |
| OTHER | EPHS | BENEFIT RES DIF | 94 | 0 | 1224 | 195 | 1046 | 1850 | 1492 | 94 | 94 | 94 | 195 | 94 | 904 | 634 |
| | | RESERVE INC DIF | 36 | 0 | 1698 | 869 | 356 | 822 | 830 | -24 | 28 | 454 | 869 | 178 | 570 | 474 |
| COMMS | EPHS | BENEFIT RES DIF | 94 | 0 | 1878 | 195 | 708 | 1728 | 1124 | 94 | 94 | 94 | 94 | 94 | 726 | 500 |
| | | RESERVE INC DIF | 30 | 0 | 1840 | 845 | 320 | 864 | 732 | 44 | 54 | 316 | 530 | 162 | 476 | 378 |

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 5

| YEAR | STATIC LAPSE ASSUMP | ---THEORETICAL---- MEAN | SAMPLE STD DEV | ******SAMPLE****** MEAN | STD DEV | LOWEST VALUE | HIGHEST VALUE |
|---|---|---|---|---|---|---|---|
| 1 | 37.0 | 40.70 | 2.20 | 40.91 | 2.19 | 37.0 | 44.4 |
| 2 | 19.1 | 21.01 | 1.04 | 21.11 | 1.03 | 19.2 | 22.8 |
| 3 | 14.8 | 16.28 | .84 | 16.33 | .84 | 14.9 | 17.7 |
| 4 | 12.6 | 13.86 | .74 | 13.83 | .74 | 12.6 | 15.1 |
| 5 | 11.5 | 12.65 | .65 | 12.59 | .65 | 11.6 | 13.8 |
| 6 | 10.9 | 11.99 | .68 | 11.88 | .67 | 10.9 | 13.0 |
| 7 | 10.3 | 11.33 | .59 | 11.40 | .58 | 10.3 | 12.4 |
| 8 | 10.0 | 11.00 | .59 | 10.94 | .58 | 10.0 | 12.0 |
| 9 | 9.6 | 10.60 | .58 | 10.67 | .58 | 9.6 | 11.6 |
| 10 | 10.4 | 11.44 | .57 | 11.45 | .57 | 10.4 | 12.5 |
| 11 | 9.4 | 10.40 | .60 | 10.48 | .60 | 9.4 | 11.4 |
| 12 | 9.3 | 10.30 | .58 | 10.33 | .58 | 9.3 | 11.3 |
| 13 | 9.1 | 10.10 | .61 | 10.13 | .61 | 9.1 | 11.1 |
| 14 | 8.9 | 9.90 | .55 | 9.95 | .54 | 9.0 | 10.9 |
| 15 | 8.7 | 9.70 | .59 | 9.70 | .59 | 8.7 | 10.7 |
| 16 | 8.4 | 9.40 | .58 | 9.48 | .58 | 8.4 | 10.4 |
| 17 | 8.4 | 9.40 | .58 | 9.38 | .58 | 8.4 | 10.4 |
| 18 | 8.2 | 9.20 | .59 | 9.20 | .59 | 8.3 | 10.2 |
| 19 | 8.1 | 9.10 | .58 | 9.10 | .58 | 8.1 | 10.1 |
| 20 | 7.6 | 8.60 | .58 | 8.71 | .57 | 7.6 | 9.6 |
| 21 | 7.2 | 8.20 | .59 | 8.20 | .59 | 7.2 | 9.2 |
| 22 | 7.1 | 8.10 | .58 | 8.05 | .58 | 7.1 | 9.1 |
| 23 | 6.9 | 7.90 | .60 | 7.95 | .60 | 6.9 | 8.8 |
| 24 | 6.7 | 7.70 | .54 | 7.70 | .54 | 6.7 | 8.7 |
| 25 | 6.4 | 7.40 | .60 | 7.38 | .60 | 6.4 | 8.4 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
SUMMARY OF SIMULATION 5

| | | | | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOB | STATIC | FORMULA | STATIC | EPHS | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| OTHER-EPHS-ASSET | | -DIFF | 6954 | 0 | -2795 | 2035 | 752 | -1609 | -788 | 2818 | 3969 | 3110 | 2035 | 4768 | 434 | 819 |
| | | -ABS(DIFF) | 6954 | 0 | 2875 | 2035 | 2301 | 2066 | 1513 | 2827 | 3969 | 3110 | 2035 | 4768 | 1310 | 1360 |
| | | -DIFF*2 | 24468 | 0 | 6365 | 2822 | 5339 | 3119 | 1557 | 4701 | 9235 | 5883 | 2822 | 11436 | 1364 | 1567 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 867 | 0 | 707 | 438 | 984 | 607 | 428 | 651 | 663 | 530 | 438 | 593 | 407 | 392 |
| | | -DIFF*2 | 1043 | 0 | 1147 | 290 | 1684 | 568 | 261 | 1088 | 927 | 443 | 290 | 345 | 290 | 275 |
| COMMS-EPHS-ASSET | | -DIFF | 10823 | 0 | -2119 | 2740 | 2210 | -748 | 342 | 5192 | 5100 | 5605 | 4167 | 7851 | 2083 | 2497 |
| | | -ABS(DIFF) | 10823 | 0 | 2297 | 2740 | 2912 | 1687 | 1446 | 5192 | 5100 | 5605 | 4167 | 7851 | 2383 | 2667 |
| | | -DIFF*2 | 61059 | 0 | 3935 | 5092 | 10831 | 2013 | 1696 | 14014 | 16353 | 19292 | 11397 | 31998 | 4795 | 5683 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 1471 | 0 | 686 | 579 | 1322 | 610 | 472 | 756 | 905 | 958 | 789 | 1063 | 612 | 618 |
| | | -DIFF*2 | 1870 | 0 | 788 | 467 | 2598 | 600 | 342 | 1064 | 1213 | 934 | 681 | 874 | 480 | 510 |
| OTHER-EPHS-BENEFIT | RES DIF | | -2034 | 0 | 2206 | -1930 | 1070 | 2006 | 1688 | -1990 | -2034 | -2034 | -1930 | -2034 | 650 | 198 |
| | RESERVE INC DIF | | -472 | 0 | 1152 | 534 | 210 | 622 | 762 | -338 | -334 | 64 | 534 | -316 | 622 | 564 |
| COMMS-EPHS-BENEFIT | RES DIF | | -2034 | 0 | 2288 | -1930 | 308 | 1694 | 924 | -2034 | -2016 | -2034 | -2034 | -2034 | -468 | -838 |
| | RESERVE INC DIF | | -434 | 0 | 1632 | 506 | 214 | 824 | 886 | -380 | -370 | -288 | -86 | -356 | 408 | 296 |

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 6

| YEAR | STATIC LAPSE ASSUMP | ---THEORETICAL---- MEAN | SAMPLE STD DEV | ******SAMPLE****** MEAN | STD DEV | LOWEST VALUE | HIGHEST VALUE |
|---|---|---|---|---|---|---|---|
| 1 | 37.0 | 37.55 | .31 | 37.61 | .30 | 37.0 | 38.1 |
| 2 | 19.1 | 19.94 | .34 | 20.00 | .33 | 19.2 | 20.7 |
| 3 | 14.8 | 15.86 | .37 | 15.93 | .36 | 15.1 | 16.7 |
| 4 | 12.6 | 13.86 | .37 | 13.92 | .36 | 13.1 | 14.8 |
| 5 | 11.5 | 12.96 | .38 | 13.01 | .38 | 12.2 | 13.8 |
| 6 | 10.9 | 12.56 | .44 | 12.59 | .44 | 11.6 | 13.6 |
| 7 | 10.3 | 12.16 | .44 | 12.19 | .44 | 11.1 | 13.3 |
| 8 | 10.0 | 12.06 | .47 | 12.09 | .47 | 11.0 | 13.3 |
| 9 | 9.6 | 11.86 | .48 | 11.88 | .48 | 10.8 | 13.0 |
| 10 | 10.4 | 12.86 | .49 | 12.85 | .49 | 11.8 | 14.1 |
| 11 | 9.4 | 12.06 | .50 | 12.07 | .50 | 10.8 | 13.3 |
| 12 | 9.3 | 12.16 | .52 | 12.18 | .52 | 11.0 | 13.5 |
| 13 | 9.1 | 12.16 | .56 | 12.18 | .56 | 10.9 | 13.4 |
| 14 | 8.9 | 12.16 | .58 | 12.18 | .58 | 10.8 | 13.5 |
| 15 | 8.7 | 12.16 | .59 | 12.17 | .59 | 10.8 | 13.6 |
| 16 | 8.4 | 12.06 | .61 | 12.07 | .61 | 10.7 | 13.5 |
| 17 | 8.4 | 12.26 | .62 | 12.28 | .62 | 10.9 | 13.6 |
| 18 | 8.2 | 12.26 | .60 | 12.29 | .60 | 11.0 | 13.6 |
| 19 | 8.1 | 12.36 | .61 | 12.41 | .61 | 10.9 | 13.9 |
| 20 | 7.6 | 12.06 | .62 | 12.11 | .62 | 10.5 | 13.5 |
| 21 | 7.2 | 11.86 | .61 | 11.92 | .61 | 10.5 | 13.4 |
| 22 | 7.1 | 11.96 | .63 | 12.03 | .63 | 10.4 | 13.3 |
| 23 | 6.9 | 11.96 | .67 | 12.03 | .67 | 10.4 | 13.5 |
| 24 | 6.7 | 11.96 | .68 | 12.03 | .67 | 10.4 | 13.5 |
| 25 | 6.4 | 11.86 | .68 | 11.93 | .68 | 10.4 | 13.5 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
SUMMARY OF SIMULATION 6

| LOB | STATIC FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET: FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS-ASSET | -DIFF | 11408 | 0 | 2815 | 4983 | 6082 | 4016 | 4815 | 9374 | 9747 | 5934 | 4983 | 9663 | 6053 | 6414 |
| | -ABS(DIFF) | 11408 | 0 | 2850 | 4983 | 6082 | 4018 | 4815 | 9374 | 9747 | 5934 | 4983 | 9663 | 6061 | 6414 |
| | -DIFF*2 | 64035 | 0 | 5287 | 15283 | 21461 | 9943 | 13607 | 42869 | 47055 | 20745 | 15283 | 46554 | 21061 | 23113 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 1364 | 0 | 487 | 791 | 914 | 633 | 725 | 1113 | 1184 | 895 | 791 | 1180 | 885 | 909 |
| | -DIFF*2 | 1203 | 0 | 243 | 592 | 810 | 461 | 514 | 897 | 984 | 689 | 592 | 912 | 651 | 672 |
| COMMS-EPHS-ASSET | -DIFF | 16086 | 0 | 4277 | 6873 | 8679 | 5876 | 6977 | 13278 | 12937 | 8503 | 7195 | 13732 | 8735 | 9180 |
| | -ABS(DIFF) | 16086 | 0 | 4316 | 6873 | 8679 | 5878 | 6977 | 13278 | 12937 | 8503 | 7195 | 13732 | 8745 | 9180 |
| | -DIFF*2 | 99999 | 0 | 12132 | 29102 | 43938 | 21360 | 28739 | 86579 | 83636 | 42890 | 32041 | 94611 | 44253 | 47653 |
| -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | -ABS(DIFF) | 1933 | 0 | 742 | 1095 | 1326 | 943 | 1072 | 1587 | 1595 | 1304 | 1163 | 1687 | 1300 | 1318 |
| | -DIFF*2 | 2351 | 0 | 576 | 1097 | 1540 | 926 | 1038 | 1736 | 1766 | 1365 | 1182 | 1824 | 1322 | 1342 |
| OTHER-EPHS-BENEFIT RES DIF | | 1968 | 0 | 2124 | 2068 | 1968 | 2166 | 1968 | 1968 | 1968 | 1968 | 2068 | 1968 | 2168 | 1976 |
| RESERVE INC DIF | | 1652 | 0 | 758 | 908 | 706 | 884 | 834 | 1558 | 1450 | 928 | 908 | 1534 | 1216 | 1082 |
| COMMS-EPHS-BENEFIT RES DIF | | 1968 | 0 | 2190 | 2068 | 1968 | 2130 | 1968 | 1968 | 1968 | 1968 | 1968 | 1968 | 2168 | 1968 |
| RESERVE INC DIF | | 1618 | 0 | 688 | 908 | 768 | 846 | 780 | 1502 | 1332 | 878 | 768 | 1488 | 1126 | 1010 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 7

| YEAR | STATIC LAPSE ASSUMP | ---THEORETICAL---- MEAN | SAMPLE STD DEV | ******SAMPLE****** MEAN | STD DEV | LOWEST VALUE | HIGHEST VALUE |
|---|---|---|---|---|---|---|---|
| 1 | 37.0 | 34.00 | 1.74 | 34.41 | 1.69 | 31.0 | 37.0 |
| 2 | 19.1 | 16.10 | 1.72 | 16.04 | 1.72 | 13.1 | 19.0 |
| 3 | 14.8 | 11.80 | 1.84 | 11.83 | 1.84 | 8.8 | 14.8 |
| 4 | 12.6 | 9.60 | 1.87 | 9.57 | 1.87 | 6.6 | 12.5 |
| 5 | 11.5 | 8.50 | 1.78 | 8.35 | 1.78 | 5.6 | 11.3 |
| 6 | 10.9 | 7.90 | 1.63 | 7.84 | 1.63 | 4.9 | 10.8 |
| 7 | 10.3 | 7.30 | 1.67 | 7.41 | 1.67 | 4.6 | 10.3 |
| 8 | 10.0 | 7.00 | 1.68 | 6.92 | 1.68 | 4.1 | 9.9 |
| 9 | 9.6 | 6.60 | 1.76 | 6.55 | 1.76 | 3.6 | 9.6 |
| 10 | 10.4 | 7.40 | 1.62 | 7.44 | 1.62 | 4.5 | 10.3 |
| 11 | 9.4 | 6.40 | 1.84 | 6.13 | 1.82 | 3.4 | 9.3 |
| 12 | 9.3 | 6.30 | 1.79 | 6.25 | 1.79 | 3.3 | 9.2 |
| 13 | 9.1 | 6.10 | 1.68 | 6.08 | 1.68 | 3.1 | 9.1 |
| 14 | 8.9 | 5.90 | 1.71 | 6.14 | 1.69 | 2.9 | 8.8 |
| 15 | 8.7 | 5.70 | 1.67 | 5.54 | 1.66 | 2.7 | 8.6 |
| 16 | 8.4 | 5.40 | 1.73 | 5.71 | 1.70 | 2.5 | 8.3 |
| 17 | 8.4 | 5.40 | 1.80 | 5.46 | 1.80 | 2.4 | 8.4 |
| 18 | 8.2 | 5.20 | 1.71 | 5.27 | 1.71 | 2.2 | 8.0 |
| 19 | 8.1 | 5.10 | 1.70 | 4.94 | 1.69 | 2.1 | 8.1 |
| 20 | 7.6 | 4.80 | 1.61 | 5.18 | 1.57 | 2.0 | 7.6 |
| 21 | 7.2 | 4.60 | 1.56 | 4.66 | 1.56 | 2.0 | 7.2 |
| 22 | 7.1 | 4.55 | 1.41 | 4.54 | 1.41 | 2.2 | 7.0 |
| 23 | 6.9 | 4.45 | 1.46 | 4.41 | 1.46 | 2.2 | 6.9 |
| 24 | 6.7 | 4.35 | 1.43 | 4.27 | 1.43 | 2.0 | 6.7 |
| 25 | 6.4 | 4.20 | 1.26 | 4.25 | 1.26 | 2.0 | 6.4 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
SUMMARY OF SIMULATION 7

| LOB | STATIC | FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS-ASSET | | -DIFF | -19296 | 0 | 2028 | -7436 | -5857 | -835 | -2763 | -13302 | -14576 | -10293 | -7436 | -16071 | -6103 | -7000 |
| | | -ABS(DIFF) | 19296 | 0 | 3815 | 7436 | 6691 | 3913 | 4387 | 13302 | 14576 | 10293 | 7436 | 16071 | 6768 | 7391 |
| | | -DIFF*2 | 99999 | 0 | 8837 | 34449 | 34939 | 10113 | 13788 | 86913 | 99999 | 58430 | 34449 | 99999 | 30676 | 35829 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 2308 | 0 | 1546 | 1389 | 1824 | 1240 | 1126 | 1607 | 1831 | 1545 | 1389 | 1933 | 1333 | 1348 |
| | | -DIFF*2 | 3849 | 0 | 1707 | 1944 | 3428 | 1571 | 1397 | 2592 | 2946 | 2201 | 1944 | 2621 | 1771 | 1798 |
| COMMS-EPHS-ASSET | | -DIFF | -28573 | 0 | 535 | -10496 | -9891 | -3182 | -5824 | -20327 | -19590 | -16162 | -12238 | -24284 | -10570 | -11627 |
| | | -ABS(DIFF) | 28573 | 0 | 4651 | 10496 | 10533 | 5834 | 7127 | 20327 | 19590 | 16162 | 12238 | 24284 | 11174 | 11953 |
| | | -DIFF*2 | 99999 | 0 | 13446 | 68718 | 83789 | 24159 | 37285 | 99999 | 99999 | 99999 | 91159 | 99999 | 82703 | 91927 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 3473 | 0 | 2067 | 1962 | 2560 | 1735 | 1686 | 2485 | 2588 | 2433 | 2169 | 2961 | 2156 | 2141 |
| | | -DIFF*2 | 8074 | 0 | 3044 | 3671 | 6379 | 2994 | 2923 | 5001 | 5364 | 4750 | 4194 | 5862 | 3905 | 3890 |
| OTHER-EPHS-BENEFIT RES DIF | | | -304 | 0 | 1516 | -203 | 1092 | 1964 | 1642 | -304 | -304 | -304 | -203 | -304 | 862 | 638 |
| RESERVE INC DIF | | | -54 | 0 | 1986 | 987 | 438 | 1006 | 1158 | -118 | -38 | 572 | 987 | 78 | 670 | 598 |
| COMMS-EPHS-BENEFIT RES DIF | | | -304 | 0 | 1968 | -203 | 764 | 1808 | 1298 | -304 | -304 | -304 | -304 | -304 | 658 | 444 |
| RESERVE INC DIF | | | -34 | 0 | 2090 | 975 | 432 | 1016 | 1028 | -56 | 14 | 434 | 648 | 92 | 574 | 494 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 8

| YEAR | STATIC LAPSE ASSUMP | ---THEORETICAL---- MEAN | SAMPLE STD DEV | ******SAMPLE****** MEAN | STD DEV | LOWEST VALUE | HIGHEST VALUE |
|---|---|---|---|---|---|---|---|
| 1 | 37.0 | 33.30 | 2.07 | 33.44 | 2.07 | 29.9 | 36.9 |
| 2 | 19.1 | 17.19 | 1.09 | 17.03 | 1.08 | 15.3 | 19.1 |
| 3 | 14.8 | 13.32 | .78 | 13.23 | .78 | 11.8 | 14.8 |
| 4 | 12.6 | 11.34 | .78 | 11.34 | .78 | 10.1 | 12.6 |
| 5 | 11.5 | 10.35 | .64 | 10.28 | .64 | 9.2 | 11.4 |
| 6 | 10.9 | 9.81 | .63 | 9.98 | .61 | 8.8 | 10.9 |
| 7 | 10.3 | 9.27 | .56 | 9.30 | .55 | 8.3 | 10.3 |
| 8 | 10.0 | 9.00 | .58 | 9.07 | .57 | 8.0 | 10.0 |
| 9 | 9.6 | 8.60 | .53 | 8.55 | .53 | 7.6 | 9.6 |
| 10 | 10.4 | 9.36 | .61 | 9.25 | .60 | 8.3 | 10.4 |
| 11 | 9.4 | 8.40 | .57 | 8.32 | .56 | 7.4 | 9.4 |
| 12 | 9.3 | 8.30 | .59 | 8.22 | .58 | 7.3 | 9.2 |
| 13 | 9.1 | 8.10 | .58 | 8.07 | .58 | 7.1 | 9.0 |
| 14 | 8.9 | 7.90 | .56 | 7.93 | .55 | 6.9 | 8.9 |
| 15 | 8.7 | 7.70 | .57 | 7.61 | .56 | 6.7 | 8.7 |
| 16 | 8.4 | 7.40 | .62 | 7.42 | .62 | 6.4 | 8.4 |
| 17 | 8.4 | 7.40 | .56 | 7.43 | .56 | 6.4 | 8.4 |
| 18 | 8.2 | 7.20 | .61 | 7.29 | .60 | 6.2 | 8.1 |
| 19 | 8.1 | 7.10 | .57 | 7.14 | .56 | 6.2 | 8.1 |
| 20 | 7.6 | 6.60 | .55 | 6.54 | .54 | 5.6 | 7.6 |
| 21 | 7.2 | 6.20 | .59 | 6.23 | .59 | 5.2 | 7.2 |
| 22 | 7.1 | 6.10 | .62 | 6.24 | .60 | 5.1 | 7.1 |
| 23 | 6.9 | 5.90 | .57 | 5.85 | .56 | 4.9 | 6.9 |
| 24 | 6.7 | 5.70 | .55 | 5.72 | .55 | 4.7 | 6.6 |
| 25 | 6.4 | 5.40 | .59 | 5.37 | .59 | 4.4 | 6.4 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
SUMMARY OF SIMULATION 8

| LOB | STATIC | FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| OTHER | EPHS-ASSET | -DIFF | -7405 | 0 | 3599 | -2352 | -405 | 2228 | 1286 | -3115 | -4257 | -3580 | -2352 | -5397 | -261 | -709 |
| | | -ABS(DIFF) | 7405 | 0 | 3674 | 2352 | 2602 | 2682 | 2017 | 3126 | 4257 | 3580 | 2352 | 5397 | 1640 | 1644 |
| | | -DIFF*2 | 27052 | 0 | 9354 | 3551 | 5490 | 4879 | 2607 | 5457 | 10024 | 7307 | 3551 | 14367 | 1789 | 1919 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 891 | 0 | 810 | 466 | 1006 | 632 | 462 | 623 | 638 | 557 | 466 | 654 | 449 | 429 |
| | | -DIFF*2 | 900 | 0 | 1177 | 284 | 1497 | 533 | 244 | 840 | 739 | 407 | 284 | 363 | 280 | 264 |
| COMMS | EPHS-ASSET | -DIFF | -11832 | 0 | 2881 | -3309 | -2109 | 1244 | -18 | -5977 | -5803 | -6621 | -4962 | -9120 | -2216 | -2699 |
| | | -ABS(DIFF) | 11832 | 0 | 3100 | 3309 | 3266 | 2253 | 1869 | 5977 | 5803 | 6621 | 4962 | 9120 | 2803 | 3061 |
| | | -DIFF*2 | 71430 | 0 | 6297 | 7022 | 11189 | 3183 | 2303 | 17897 | 19603 | 25508 | 15376 | 42359 | 5985 | 6975 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 1536 | 0 | 847 | 649 | 1366 | 669 | 533 | 786 | 937 | 1048 | 870 | 1176 | 698 | 694 |
| | | -DIFF*2 | 1879 | 0 | 874 | 502 | 2455 | 580 | 340 | 941 | 1109 | 992 | 749 | 1023 | 535 | 547 |
| OTHER | EPHS-BENEFIT | RES DIF | -1920 | 0 | 2092 | -1820 | 1132 | 2022 | 1818 | -1884 | -1920 | -1920 | -1820 | -1920 | 848 | 428 |
| | | RESERVE INC DIF | -458 | 0 | 1470 | 596 | 260 | 746 | 886 | -430 | -392 | 90 | 596 | -292 | 638 | 570 |
| COMMS | EPHS-BENEFIT | RES DIF | -1920 | 0 | 2206 | -1820 | 494 | 1796 | 1102 | -1920 | -1920 | -1920 | -1920 | -1920 | -186 | -516 |
| | | RESERVE INC DIF | -452 | 0 | 1812 | 556 | 186 | 882 | 926 | -498 | -436 | -274 | -76 | -346 | 368 | 302 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF SIMULATED ACTUAL LAPSES
SIMULATION 9

| | STATIC | ---THEORETICAL---- | | | | | |
|---|---|---|---|---|---|---|---|
| | LAPSE | | SAMPLE | ******SAMPLE****** | | LOWEST | HIGHEST |
| YEAR | ASSUMP | MEAN | STD DEV | MEAN | STD DEV | VALUE | VALUE |
| 1 | 37.0 | 36.63 | .22 | 36.64 | .22 | 36.3 | 37.0 |
| 2 | 19.1 | 18.54 | .24 | 18.56 | .23 | 18.1 | 19.0 |
| 3 | 14.8 | 14.09 | .26 | 14.13 | .26 | 13.5 | 14.6 |
| 4 | 12.6 | 11.77 | .25 | 11.80 | .25 | 11.2 | 12.3 |
| 5 | 11.5 | 10.55 | .26 | 10.58 | .26 | 10.0 | 11.2 |
| 6 | 10.9 | 9.84 | .27 | 9.87 | .27 | 9.3 | 10.4 |
| 7 | 10.3 | 9.14 | .28 | 9.18 | .28 | 8.6 | 9.7 |
| 8 | 10.0 | 8.74 | .28 | 8.77 | .27 | 8.1 | 9.3 |
| 9 | 9.6 | 8.24 | .29 | 8.27 | .29 | 7.6 | 8.8 |
| 10 | 10.4 | 8.93 | .30 | 8.96 | .29 | 8.2 | 9.6 |
| 11 | 9.4 | 7.83 | .31 | 7.86 | .31 | 7.2 | 8.6 |
| 12 | 9.3 | 7.63 | .32 | 7.67 | .32 | 6.9 | 8.4 |
| 13 | 9.1 | 7.33 | .32 | 7.38 | .32 | 6.7 | 8.1 |
| 14 | 8.9 | 7.03 | .33 | 7.07 | .32 | 6.4 | 7.9 |
| 15 | 8.7 | 6.73 | .34 | 6.78 | .33 | 6.0 | 7.5 |
| 16 | 8.4 | 6.33 | .34 | 6.37 | .34 | 5.6 | 7.1 |
| 17 | 8.4 | 6.23 | .35 | 6.27 | .35 | 5.6 | 7.1 |
| 18 | 8.2 | 5.93 | .35 | 5.97 | .35 | 5.2 | 6.8 |
| 19 | 8.1 | 5.73 | .35 | 5.78 | .35 | 5.0 | 6.6 |
| 20 | 7.6 | 5.13 | .35 | 5.17 | .35 | 4.5 | 6.0 |
| 21 | 7.2 | 4.63 | .36 | 4.68 | .36 | 3.9 | 5.6 |
| 22 | 7.1 | 4.43 | .36 | 4.48 | .36 | 3.7 | 5.3 |
| 23 | 6.9 | 4.13 | .38 | 4.18 | .37 | 3.3 | 5.1 |
| 24 | 6.7 | 3.83 | .38 | 3.87 | .37 | 3.0 | 4.8 |
| 25 | 6.4 | 3.43 | .38 | 3.47 | .38 | 2.6 | 4.3 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC METHODS COMPARED TO EPHS
SUMMARY OF SIMUALATION 9

| LOB | STATIC | FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
| OTHER | EPHS | ASSET-DIFF | -8377 | 0 | -2070 | -3937 | -4585 | -3007 | -3607 | -7039 | -7269 | -4770 | -3937 | -7351 | -4569 | -4844 |
| | | -ABS(DIFF) | 8377 | 0 | 2184 | 3937 | 4585 | 3026 | 3607 | 7039 | 7269 | 4770 | 3937 | 7351 | 4588 | 4847 |
| | | -DIFF*2 | 34632 | 0 | 2964 | 8977 | 11613 | 5451 | 7411 | 24130 | 25980 | 12509 | 8977 | 26764 | 11710 | 12846 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 977 | 0 | 373 | 562 | 631 | 455 | 510 | 811 | 848 | 642 | 562 | 863 | 640 | 649 |
| | | -DIFF*2 | 605 | 0 | 121 | 271 | 356 | 209 | 233 | 452 | 485 | 318 | 271 | 472 | 307 | 316 |
| COMMS | EPHS | ASSET-DIFF | -11880 | 0 | -3193 | -5485 | -6606 | -4453 | -5282 | -10032 | -9783 | -6882 | -5731 | -10498 | -6642 | -6989 |
| | | -ABS(DIFF) | 11880 | 0 | 3323 | 5485 | 6606 | 4472 | 5282 | 10032 | 9783 | 6882 | 5731 | 10498 | 6666 | 6992 |
| | | -DIFF*2 | 70084 | 0 | 6877 | 17457 | 24231 | 11928 | 15937 | 49318 | 47297 | 26213 | 19112 | 54902 | 24905 | 26884 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 1389 | 0 | 560 | 785 | 922 | 676 | 753 | 1159 | 1146 | 933 | 825 | 1234 | 935 | 940 |
| | | -DIFF*2 | 1203 | 0 | 284 | 515 | 695 | 429 | 481 | 895 | 885 | 644 | 553 | 957 | 634 | 643 |
| OTHER | EPHS | BENEFIT RES DIF | 1840 | 0 | 2054 | 1940 | 1840 | 2250 | 1912 | 1840 | 1840 | 1840 | 1940 | 1840 | 2098 | 1974 |
| | | RESERVE INC DIF | 1976 | 0 | 1082 | 1216 | 996 | 1218 | 1138 | 1942 | 1800 | 1284 | 1216 | 1922 | 1510 | 1498 |
| COMMS | EPHS | BENEFIT RES DIF | 1840 | 0 | 2118 | 1940 | 1840 | 2200 | 1880 | 1840 | 1840 | 1840 | 1840 | 1840 | 2068 | 1954 |
| | | RESERVE INC DIF | 1944 | 0 | 1034 | 1216 | 994 | 1126 | 1054 | 1896 | 1706 | 1238 | 1060 | 1896 | 1424 | 1422 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC
METHODS COMPARED TO EPHS
AVERAGE OF SUMMARY OF 9 MONTE CARLO SIMULATIONS

| LOB | STATIC | FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET: FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER-EPHS | -ASSET | -DIFF | -220 | 0 | 494 | -186 | 198 | 378 | 306 | -131 | -134 | -337 | -186 | -341 | 123 | 87 |
| | | -ABS(DIFF) | 8925 | 0 | 2760 | 3453 | 3991 | 2827 | 2964 | 6134 | 6754 | 4517 | 3453 | 7158 | 3653 | 3863 |
| | | -DIFF*2 | 54381 | 0 | 6387 | 10392 | 14141 | 6406 | 7139 | 26760 | 32693 | 16466 | 10392 | 35981 | 11415 | 12764 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 1134 | 0 | 945 | 802 | 1083 | 764 | 670 | 909 | 961 | 846 | 802 | 915 | 729 | 726 |
| | | -DIFF*2 | 1367 | 0 | 1412 | 814 | 1577 | 799 | 598 | 1147 | 1147 | 858 | 814 | 841 | 671 | 666 |
| COMMS-EPHS | -ASSET | -DIFF | -490 | 0 | 505 | -323 | 91 | 344 | 243 | -365 | -331 | -648 | -437 | -656 | -11 | -58 |
| | | -ABS(DIFF) | 13146 | 0 | 3182 | 4781 | 5667 | 3638 | 4075 | 9167 | 8945 | 7071 | 5591 | 10742 | 5498 | 5819 |
| | | -DIFF*2 | 99999 | 0 | 8378 | 20014 | 29983 | 11438 | 14902 | 59224 | 58658 | 39971 | 26396 | 81349 | 26775 | 29270 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 1706 | 0 | 1191 | 1102 | 1492 | 989 | 918 | 1250 | 1317 | 1300 | 1217 | 1405 | 1080 | 1073 |
| | | -DIFF*2 | 2679 | 0 | 1928 | 1474 | 2722 | 1288 | 1087 | 1778 | 1901 | 1753 | 1663 | 1822 | 1315 | 1311 |
| OTHER-EPHS | BENEFIT RES DIF | | -84 | 0 | 1868 | 324 | 1287 | 1962 | 1721 | 149 | 87 | 84 | 324 | 11 | 1294 | 1067 |
| | RESERVE INC DIF | | 289 | 0 | 1528 | 1171 | 451 | 933 | 1015 | 348 | 329 | 907 | 1171 | 555 | 857 | 801 |
| COMMS-EPHS | BENEFIT RES DIF | | -132 | 0 | 2114 | 325 | 1016 | 1857 | 1452 | 81 | 102 | -36 | 76 | -49 | 958 | 753 |
| | RESERVE INC DIF | | 289 | 0 | 1676 | 1157 | 443 | 975 | 1000 | 324 | 311 | 728 | 842 | 504 | 746 | 696 |

APPENDIX 3—*Continued*

DYNAMIC METHOD COMPARISON TESTS

STATISTICAL SUMMARY OF DYNAMIC
METHODS COMPARED TO EPHS
AVERAGE RELATIVE PERFORMANCE UNDER 9 SIMULATIONS

| LOB | STATIC | FORMULA | STATIC | EPHS | DYNAMIC METHODS ASSET: FULL | RAR | MOD | MOD2 | MOD3 | ARM | MARM | LEVEL | LVLPV | ANN1 | ANN2 | ANN3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | EPHS | ASSET-DIFF | 0 | 0 | 3 | 92 | 89 | 33 | 53 | 163 | 176 | 121 | 92 | 191 | 88 | 98 |
| | | -ABS(DIFF) | 0 | 0 | 82 | 77 | 98 | 77 | 76 | 134 | 149 | 100 | 77 | 157 | 85 | 88 |
| | | -DIFF*2 | 0 | 0 | 88 | 59 | 102 | 69 | 60 | 146 | 181 | 93 | 59 | 197 | 72 | 76 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 0 | 0 | 112 | 92 | 131 | 92 | 80 | 109 | 114 | 98 | 92 | 107 | 86 | 85 |
| | | -DIFF*2 | 0 | 0 | 155 | 79 | 171 | 86 | 63 | 129 | 124 | 86 | 79 | 88 | 71 | 70 |
| COMMS | EPHS | ASSET-DIFF | 0 | 0 | 114 | 70 | 113 | 115 | 111 | 139 | 130 | 31 | 31 | 106 | 121 | 120 |
| | | -ABS(DIFF) | 0 | 0 | 65 | 75 | 95 | 67 | 69 | 141 | 139 | 113 | 90 | 167 | 87 | 92 |
| | | -DIFF*2 | 0 | 0 | 54 | 55 | 101 | 51 | 52 | 156 | 158 | 117 | 78 | 221 | 76 | 82 |
| | -AMORT | -DIFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | -ABS(DIFF) | 0 | 0 | 101 | 91 | 129 | 84 | 77 | 104 | 110 | 109 | 102 | 117 | 89 | 89 |
| | | -DIFF*2 | 0 | 0 | 124 | 83 | 176 | 78 | 63 | 108 | 115 | 102 | 95 | 106 | 75 | 75 |

## DISCUSSION OF PRECEDING PAPER

STEPHEN D. BICKEL:

Mr. Evans has done a good job of exposing a serious problem for the accounting and actuarial professions. We should pity the poor users of the financial statements.

The examples in Appendix 2 show that even small variations in lapse rates can lead to substantial differences in the unamortized acquisition expense asset, depending upon the amortization method being used. In the case of the "5 percent plus the 110 percent lapse" assumption, the unamortized acquisition expense asset for "other" expense types at duration 10 is $13.14 under the fully dynamic method and $25.35 under the ANNI method.

I think the real issue is whether or not the gain or loss from withdrawal, as defined in the Horn paper*, should be disclosed to the financial statement user in the year it occurs. All the methods other than the FULL method seem to defer the recognition of this event over some period of time. If this wide variety of methods is to be permitted by the accounting profession, the financial statement user should at least be entitled to a disclosure of the method being used.

Many actuaries agree with Mr. Evans' suggestion that Eventual Perfect Hindsight is the appropriate standard of comparison. However, that concept is inconsistent with the historical cost accounting theory that applies to everything else in the financial statement (such as the benefit reserves). It does not produce results comparable to the results for companies that use the "factor" method of determining benefit reserves and unamortized expenses. I think the EPHS "standard" was developed to rationalize the use of methods covenient for the preparer of financial statements and that it results in great harm to the user.

I am glad Mr. Evans has submitted this paper, and I hope it will lead to giving this subject all the fresh air it deserves.

CLAUDE Y. PAQUIN:

The use of interest in the amortization of acquisition expenses fails to produce an amortization in proportion to premium revenues. The use of interest does produce a delayed amortization, in proportion (after issue) to an interest-adjusted revenue stream. As a mathematical fact, this assertion

*HORN, R.G., "Life Insurance Earnings and the Release from Risk Policy Reserve System," *TSA* XXIII (1971):391-418.

cannot be contradicted unless one begins to take liberties with the meaning of the expression "in proportion to." That much was demonstrated in a *TSA* paper* that I wrote in 1973.

A paper that would discuss ways of amortizing expenses, dynamic or otherwise, without reference to the underlying purpose of the process itself can do the reader a disservice. The purpose of amortizing expenses is to provide a means by which the owners of the business (stockholders) can be informed, on a timely basis, of significant changes in the profitability of their business. Hence, formulas that tend to sugar-coat the results of, say, bad persistency, can be harmful if they become tools (even unwittingly) for obscuring or delaying recognition of current experience, especially when materially adverse.

On a purely theoretical basis, I would compare Eventual Perfect Hindsight to alchemy. What the proponents of GAAP for stock life insurers sought, in the early 1970s, was an approach superior to what was then in use, namely, statutory earnings that were often out of touch with reality. Without entertaining the delusive belief that earnings could be reported with perfect accuracy, the GAAP proponents had the following objectives: (1) to see earnings reported on a current and realistic basis, (2) to promote a tamper-proof method for reporting earnings, and (3) to foster comparability (between accounting periods and insurers) through uniformity.

Thus, while there may be merit in being able to consider multiple ways of computing expense charges and earnings, it remains important not to lose track of the practical goals and professional standards of the earnings development process. It should not be considered exclusively as a compliment for actuaries to be thought of as people who can come up with a hundred different ways of amortizing expenses.

GODFREY PERROTT:

The author asserts the the Eventual Perfect Hindsight method of amortizing expenses is the perfect solution to GAAP accounting. This assertion is valid only for minor consistent deviations of actual experience from the assumptions originally used to calculate the amortization schedule. However,

*PAQUIN, C.Y. "The Development of Mean Natural Reserve Factors and Methods of Amortizing Acquisition Expenses in Adjusting Life Insurance Company Earnings," *TSA* XXV (1973): 459-84. At the time this paper was written, GAAP earnings were conceived of as the product of an adjustment to the statutory earnings theretofore reported. In contemporary actuarial practice, the development of GAAP earnings has become a process more and more independent of the statutory computations.

if it is used in a period of unpredictable change (such as shock lapses caused by tax law changes or poor investment performance), EPHS will tend to mask the very problems the accounting system should highlight. It could be argued that EPHS is a reasonable measurement standard for scenarios A, B and possibly C in the paper, but it is very difficult to justify it for scenarios D and E.

A slight modification of the retrospective annual recalculation (RAR) method produces much better results. When the recalculation is made, the future assumptions, rather than being frozen at issue, should be the current best-estimate assumptions. The recalculated amortization schedule is used only to determine the deferred acquisition cost as of the valuation date. (In other words, the asset at the beginning of the accounting period is not adjusted.) Under this approach, the accounting affects of a traumatic event (either good or bad) will be reflected in the current period and not allocated in part to prior periods. This is essentially how the flexible premium universal life portion of *FAS 97* operates.

It is helpful to consider "disasters" in other unrelated industries that might be compared to the shock lapse of an insurance block of policies. We might consider the default of an investment-grade bond or the failure of a subcontractor late in the life of a multiyear construction project. When either of these events occurs, it is charged to the current period. It is neither normal nor appropriate to recast prior-period reported earnings in light of the "perfect hindsight" now available.

It is particularly constructive to assume the management team has changed during the period between the initiation of the transaction and the disaster. The management team that contracted to perform the construction project, purchase the bond, or design and market the insurance policies would be confident that it made a sound business decision and that the decision should be accounted for in that manner during the initial years. The management team that is in place when the disaster strikes, on the other hand, will embrace EPHS because it will attribute a portion of the loss to the prior management. The key question is not to look from the end of the transaction back and allocate gains or losses on what is in effect a pro-rata manner, but rather to attribute unpredictable events to the period in which they happen and hold current management accountable.

Consider two insurance companies that write an identical insurance portfolio (cohort of policies) with an identical profit margin. The first company sells the block of business five years after issue at below-market price to raise capital. The second company holds its portfolio and experiences an

unforeseen shock lapse three years later. Under the EPHS method, the companies would account for the business differently in the years before the first company sold its portfolio. This seems inappropriate.

In conclusion, the modified RAR as described above is a much better comparison standard than the EPHS standard. It would be interesting to see how much the conclusions of the study would change if modified RAR were used in place of EPHS as the comparison standard.

(AUTHOR'S REVIEW OF DISCUSSION)

MARK D.J. EVANS:

As Mr. Paquin mentions, the paper does not delve into several issues surrounding the amortization of expenses. The paper has a narrow focus on the behavior of various dynamic techniques and, even so, tends to look at the problem only quantitatively rather than philosophically. This omission was intentional, but Mr. Paquin's comments should alert the reader to this. Mr. Perrott complains that the Eventual Perfect Hindsight method is not the perfect solution. Similarly, Mr. Bickel complains that the EPHS standard was developed to rationalize the development of conclusions that produce convenient results.

Mr. Paquin compares EPHS to alchemy. However, the emphasis in my paper was on attempting to amortize acquisition expenses in proportion to emerging premium revenues. If one accepts that as the goal (see Pharr [8], pages 288–295 of Posnak [9], and reference to the *Audits of Stock Life Insurance Companies* made later in this review), then the EPHS method is the perfect solution for amortizing deferred acquisition costs. The paper states that without a crystal ball, perfect accuracy is unobtainable (as Mr. Paquin correctly reiterates), but that is not a reason to shy away from attempting to derive techniques that behave similarly to EPHS. The paper probably should have made it clear that the EPHS standard is the perfect solution only if one accepts the basic premise of the paper: that it is desirable to amortize acquisition expenses in proportion to emerging premium revenues.

Implicitly, Mr. Perrott does not accept this premise. He has enumerated various justifications for deviating from amortizing deferred acquisition costs in proportion to premium revenue. It was not the purpose of this paper to challange previous actuarial literature suggesting that it is appropriate to amortize acquisition expenses in proportion to premium revenues.

Mr. Perrott questions the appropriateness of recasting prior period reported earnings. My paper does not suggest doing this, yet I do not think there is

anything wrong with striving to produce results similar to what one might judge to be a reasonable allocation of income by period in a smooth fashion given the benefit of perfect hindsight. Furthermore, none of the dynamic methods in my paper permit the restatement of prior periods. Given that the asset is whatever it was at the beginning of the year, the methods address how much of the current year's difference between actual and expected experience (good or bad) should be reflected in the current year's amortization and how much should be reflected in future year's amortization; realizing, once again, that if the difference is all reflected in the current year's amortization, one will not achieve an amortization of acquisition expenses in proportion to premium revenues. Contrary to Mr. Perrott's suggestion, current management cannot move losses to a period corresponding to prior management under any of the methods discussed in the paper. Thus, Mr. Perrott engages in an interesting theoretical discussion that I am not sure addresses the point. That does not detract, however, from the validity of the philosophical question, which perhaps could be posed as follows, "Is it better to use dynamic techniques that tend to amortize acquisition expenses in proportion to premium revenue or is it better to use dynamic techniques that tend to amortize, in a more dramatic fashion, the events of the current accounting period?" Perhaps further discussions will shed light on what the right answer is, if a single right answer exists.

Mr. Bickel and Mr. Paquin both argue in favor of the FULL method because of its characteristic of immediately highlighting differences between actual and expected results. Mr. Bickel references some variance analysis formulas that are enabled by use of the FULL method. The paper states that this is more appropriate when one wishes to preserve future profit margins. However, it is appropriate to weigh this objective against the desire to amortize deferred acquisition costs as a level percentage of premium. Amortizing expenses in proportion to premium revenues tends to lead to a smooth earnings pattern as a percentage of premium income. There are compelling philosophical justifications for this perspective, also (see my discussion of McLaughlin [5]). In conjuction with his advocacy of the FULL method, Mr. Paquin warns that using other methods can be harmful when persistency is quite bad. This concern should be considered in loss-recognition testing. With the FULL dynamic method, regardless of past experience, if future estimates of persistency and so on equal the original GAAP assumptions and the group of policies did not face a recoverability problem at issue, then one can be assured there is not a loss-recognition problem at the current time. This is not true of the other methods.

Mr. Perrott has suggested an alternative dynamic method. His comments merit the consideration of those interested in this subject.

With respect to the details of Mr. Perrott's discussion, it is not clear to me why he thinks that EPHS is a reasonable measurement standard for scenarios A, B, and possibly C, but not for scenario E.

Mr Perrott describes a method somewhat similar to the operation of *FAS 97.* It seems to be a reasonable approach given the philisophical position he advocates. I presume that under his approach he would still have the amortization be a function of premium, at least on a static basis, rather than the approach *FAS 97* takes with respect to amortizing in proportion to the margins in the product. In other words, I assume it is his intent only to borrow the dynamic approach for *FAS 97* and apply it to traditional insurance products in which the original static asset is still calculated by the conventional means. Mr. Perrott claims the modified RAR he has described would be a better comparison standard than the EPHS standard. This is perhaps true if one casts aside the goal of this paper to amortize in proportion to premium revenue. To use the modified RAR as the comparison standard would invove an added complexity: what to use for future assumptions upon recalculation? In the hypothetical tests such as those conducted in this paper, this becomes a tricky question. If the current best estimate assumptions turn out to be quite accurate, then the modified RAR approaches EPHS.

Mr. Bickel mentions a large difference between the FULL and ANN1 method. This is a good example of why I recommend against use of some of the methods, including the ANN1 method.

With respect to Mr. Paquin's concern about the use of interest in amortizing deferred acquisition costs, the second sentence of the abstract of the paper should have read, "The emphasis is on attempting to *apply a level percentage of premium revenues to reduce the deferred acquisition cost accumulated with interest,"* instead of "amortize acquisition expenses in proportion to emerging premium revenues."

Analogous alterations perhaps should have been made throughout the paper to avoid any possible confusion.

Mr. Paquin objects to the use of interest in calculating deferred acquisition cost assets. Although my personal opinion is that deferred acquisition cost assets should be calculated with interest, it was not the purpose of this paper to explore questions concerning whether interest should be used to calculate deferred acquisition cost assets. The paper was intended to focus upon means to dynamically adjust the asset rather than how to calculate the asset schedules. Furthermore, the results should not be particularly dependent upon the

inclusion or exclusion of interest. Thus, rather than delve into theoretical considerations on the matter of interest, I will mention some references.

*Audits of Stock Life Insurance Companies*, prepared by the AICPA, requires the use of interest in calculating deferred acquisition costs. For example, on page 71, under the section entitled "Recognition of Costs," we find the following statement:

> "Having determined the manner in which premium revenue is to be recognized, it is necessary to consider the manner in which cost (benefits and expenses) should be associated with premium revenue.... Annual charges for costs in conformity with generally accepted accounting principals should be determined using methods which include assumptions for interest, mortality, withdrawals, expenses and other benefits."

The "Financial Reporting Recommendations and Interpretations" produced by the American Academy of Actuaries states, under Recommendation 1, Interpretation 1-C, paragraph 2, that

> "The audit guides requirement that the negative reserve component reflecting pre-paid and unamortized acquisition expenses be shown separately as a deferred charge is based on accounting principles, not on actuarial principles. The choice of methods for determining the amount of such deferred charges is not necessarily governed by actuarial principles, but actuarial techniques may be employed for such determination and must be employed to test recoverability of the amount of unamortized acquisition expense. To be consistent with actuarial principles, the differences between the amount accrued on the balance sheet as reserve liability and the amount carried as deferred charge on account of unamortized acquisition expense must be substantially equal to the present value of future costs less the present value of future valuation premiums, based on actuarial assumptions determined in accordance with Recommendation 1."

This implies that the deferred acquisition cost should be calculated reflecting interest, but that other methods of amortizing the deferred acquisitions costs are appropriate if they produce reasonable results. In other words, this would appear to permit amortizing the deferred acquisition costs without interest as an approximation for calculations involving interest. Posnak (see page 290 of [9]) takes a stance that is similar, though perhaps more tolerant of calculating deferred acquisition costs without interest.

Mr. Paquin [7] suggests using zero interest. Discussions by Leonard H. McVity, Robert L. Collett, and Henry Kunkemueller provide arguments for using interest to amortize deferred acquisition costs.

Mr. Paquin also suggests using zero interest in discussions of Pharr [8] and Smith [10]. Smith [10] offers a response. Other references on using interest to amortize deferred acquisition costs include a very thorough development in McLaughlin ([5], in addition to formula development, see

Graph 10 in Appendix I, Appendix II, and my discussion). Warnock [11] goes through a rigorous, but easy to follow, explanation of GAAP reserves that includes a demonstration of the effects of using interest to amortize deferred acquisition costs. Other sources on the subject are Horn [4] and Milgrom [6].

Mr. Paquin makes a case for uniformity and consistency of approach, and Mr. Bickel also touches upon this. This is a reasonable concern. Some may argue that diversity of GAAP practices is already large. On the other hand, this must be balanced against permitting varying practices for varying circumstances. Also, the actuary should have some liberty to exercise his or her judgment. In fact, the American Academy of Actuaries' "Financial Reporting Recommendations and Interpretations" in its introductions states,

> "It would be inappropriate to prescribe inflexible guides for the performance of the actuaries work in connection with the financial reporting of insurance companies. The selection of assumptions and methods involves professional judgment based on the circumstances applicable to a particular situation, including the purpose or purposes which the actuary's work is intended to serve. The promulgation of uniform procedures or practices which fail to take into account such circumstances and variables would be unprofessional."

Whether or not a diversity of approaches to actuarial problems is desirable, it is important to explore alternatives and search for improvements. Such research should be communicated and subjected to discussion. To that end, I express my appreciation to Mr. Bickel, Mr. Paquin, and Mr. Perrott. I thank the reviewers, especially for their suggestions to improve a previous submission of this paper. Lastly, I thank my colleagues for their assistance.

## REFERENCES

1. AMERICAN ACADEMY OF ACTUARIES. *1988 Yearbook.* Itasca, Ill., 1988, 336.
2. AMERICAN ISTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS. *Audits of Stock Life Insurance Companies.* New York, N.Y., 1972.
3. FINANCIAL ACCOUNTING STANDARDS BOARD. *Statement of Financial Accounting Standards No. 60, Accounting and Reporting by Insurance Enterprises.* Stamford, Conn., 1982.
4. HORN, R.G.. "LIfe Insurance Earnings and the Release from Risk Policy Reserve System," *TSA* XXIII (1971):391-99.
5. MCLAUGHLIN, S. M. "A Comparison of Alternative Generally Accepted Accounting Principles (GAAP) Methodologies for Universal Life," *TSA* XXXIX (1987):131-67.

6. MILGROM, P.R.. "On Understanding the Effects of GAAP Reserve Assumptions," *TSA* XXVII (1975):71-92.
7. PAQUIN, C.Y.. "The Development of Mean Natural Reserve Factors and Methods of Amortizing Acquisition Expenses in Adjusting Life Insurance Company Earnings," *TSA* XXV (1973):459-84.
8. PHARR, J.B. "GAAP Acquisition Expense Amortization Methodology," *TSA* XXX (1978):169-90.
9. POSNAK, R. *Ernst & Ernst GAAP, Stock Life Companies.* New York, N.Y., 1974.
10. SMITH, B.M. "Pricing in a Return-on-Equity Environment," *TSA* XXXIX (1987):257–71.
11. WARNOCK, R.L. *"Part 10 (Life) Study Notes—GAAP Reserves,* Education and Examination Committee. Chicago, Il.: Society of Actuaries, 1978.