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Classification of Insurance Products According to GAAP for Mutuals

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Abstract

In January 1995 the Financial Accounting Standards Board promulgated Statement No. 120. SFAS 120 merely states that GAAP accounting for mutual companies will be governed by the AICPA's Statement of Position 95-1, *Accounting for Certain Insurance Activities of Mutual Life Insurance Enterprises.* SOP 95-1 is commonly referred to as GAAP for Mutuals.

This paper addresses the classification of products according to their accounting standards: SFAS 60 for traditional products, SFAS 97 for interest sensitive products, and SOP 95-1 for participating products. In particular, the question of which products should be classified under the Statement of Position will be addressed. In addition, it will be shown that if a product's dividend formula passes on to the policyholder significantly less than a full asset share an "over-reserving" problem will occur if the Statement of Position is used as the accounting system. The appendix includes a brief overview of the Statement of Position.

Note: The views and interpretation expressed in this paper are the solely the views of the author. MetLife takes no responsibility for the opinions expressed herein.

0. Overview

This paper is divided into three parts. Part I gives several examples of different products and then classifies them as covered under the Statement of Position 95-1 (hereafter referred to as the "SOP") or not. Part II demonstrates that if a product's dividend structure transfers to the policyholder significantly less profits then that contemplated by the SOP, using the SOP's accounting method will cause excess dividends to be held. Part III discusses sundry SOP issues. The appendix gives an overview of the Statement of Position GAAP for Mutuals. The reader who is unfamiliar with the SOP may wish to turn to the appendix first. The experienced reader may use it for reference, or a quick review.

The SOP supersedes FAS 97 which in turn supersedes FAS 60. Thus when investigating under which reporting system a product qualifies one should first try the SOP then FAS 97. If both are rejected, FAS 60 will govern. The issue of whether a product is FAS 60 or FAS 97 (assuming it is not SOP) is beyond the scope of this paper, although it is addressed briefly.

There are, in general, two ways to read any document - a strict and a loose interpretation. I have taken the strict interpretation when drawing conclusions but I have tried to give a fair assessment of the loose interpretation as well.

Part I - Product Classification

1.0 Preliminaries

This part of the paper will deal with the issue of whether or not a product should be classified as a SOP product. To aid in the analysis, specific sections of the SOP will be examined. The implications of each of these sections on five sample products will be discussed. The underlying question that needs to be addressed is:

How much experience needs to be passed to the policyholder, via the dividend structure, for a product to be classified as a SOP product?

According to the SOP (§5), the defining characteristic of a participating product is whether it equitably distributes dividends that are based on actual company experience. SOP §5 states that it applies to life insurance contracts that have both of the following characteristics:

a. They are long-duration participating contracts that are expected to pay dividends to policyholders based on actual experience of the insurance enterprise.

b. Annual policyholder dividends are paid in a manner that identifies divisible surplus and distributes that surplus in approximately the same proportion as the contracts are considered to have contributed to divisible surplus (commonly referred to in actuarial literature as the *contribution principle*).

1.1 Examples

The following examples are presented to facilitate our discussion of this topic. First we present a small twist on the famous three factor formula:

$$\begin{aligned} Div_t &= \alpha \left(i^{(E)} - i^{(D)} \right) * {}_tV \\ &+ \beta \left(q^{(D)} - q^{(E)} \right) * \left(Face_t - {}_tV \right) \\ &+ \gamma \left(e^{(D)} - e^{(E)} \right) * \left(1 + i^{(D)} \right) \end{aligned}$$

Where, Div_t is the t-th year dividend, $^{(E)}$ means experience, $^{(D)}$ means dividend[1], i is interest, V is reserve, e is expenses, and α, β, and γ are factors between zero and one inclusive. I will denote this three-factor formula (3FF).

The following five sample products are all traditional ordinary, dividend paying policies, with the dividends defined according to the formulas below.

Example 1. Div_t = (3FF) + $\epsilon \left(w^{(D)} - w^{(E)} \right) * \left({}_tCV_t - V \right)$. Where, w is the probability of withdrawal, and $\alpha=\beta=\gamma=\epsilon=1$.

Example 2. α, β, and γ each set at 80%.

Example 3. α=50%, β=0%, and γ=0%.

Example 4. α= 1%, β=1%, and γ=1%.

Example 5. In equation (3FF), $i^{(E)}$ is not the company experience, but tied to an external benchmark such as 30 year treasury bonds. The company further sets $q^{(E)}$ to an external factor such as industry wide experience, and expenses are tied to increases in the CPI. Furthermore, $\alpha=\beta=\gamma=1$.

The above examples are not completely arbitrary. Examples 1 and 2 are commonly found in practice. Example 3 is a common formula for foreign insurance companies (for example Mexican insurance companies). Example 4 is not realistic and just included for comparative purposes. Example 5 is found in practice in countries which are heavily regulated. For example, Korean insurance companies are mandated by the Ministry of Finance to pay dividends according to government computed "earned" interest and industry mortality.

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[1] (D) denotes dividend fund assumptions which are conservative assumptions. See appendix.

1.2 Classification of Examples - First Attempt

The first attempt at classification is based on the SOP §5 (quoted above).

Examples 1 and 2 clearly fulfill the requirements of the SOP, that is, they transmit actual company experience, identify divisible surplus, and distribute it equitably.

Example 3 passes on company experience equitably but it does not necessarily identify divisible surplus. This is due to the fact that mortality and expense margins are not included in the formula. For example, if there was a company with a large expense gap that used the formula in example 3, the company could be losing money and still be paying a dividend. This dividend would be from "corporate surplus," not "divisible surplus."

However, since example 2 does not account for withdrawal gains or losses we can construct a similar situation in which example 2 would distribute corporate surplus. Consider a company with example 2's dividend formula such that all but one policy lapsed. This company may have large losses and still pay out a dividend. Nonetheless example 2 would still be covered by the SOP whereas example 3 is unclear. The difference between examples 2 and 3 will be analyzed more later.

Example 4 clearly passes on actual company experience, identifies divisible surplus, and distribute it equitably. So should example 4 be covered under the SOP? Intuition tells us that it should not, since the experience passed through the dividend is minimal. More evidence will later justify rejecting this example from SOP coverage.

Example 5 would be rejected since the SOP specifically states that company experience must be passed to the policyholder and this example does not do that.

1.3 SOP Clarification of Participating Contracts

The SOP (§27) tries to clarify the issue of what is a participating contract by stating that:

> ... Annual policyholder dividends paid generally reflect the company's experience and performance in investment activity, mortality experience, and contract administration for each class of contracts. It is the dividend determination and distribution that distinguishes participating life insurance from nonparticipating life insurance.

Thus, the SOP itself tells us the definition of participating - the dividend structure includes interest, mortality, and expenses, and general experience is passed to the policyholder.

Examples 1 and 2 are clearly covered by this. Example 1 includes more than required and example 2 generally passes investment, mortality, and expense gains. Example 3, 50% of an interest dividend, would have to be rejected based upon this. Not enough experience is passed to make this a par product - it does not identify divisible surplus.

What about example 4? This example passes on 1% of a classical interest, mortality, and expense dividends. Since it covers all three categories, should it be covered by the SOP? We could say that example 4 would not fall under the heading of "generally reflect the experience." That is, even though the three dividend categories are touched on, **general experience** is still not reflected in the dividends. In other words, the dividend structure includes "tangential" or "minimal" experience and not "general experience." Thus, it is too far away from the above definition to be classified as participating, and we will reject the hypothesis that it is covered by the SOP.

We would also reject Example 5 because it is not company experience that is being shared with the policyholder. In fact, the SOP implies (§41, §42) that products whose dividends are "unrelated to actual net income" should be covered under FAS 60, with explicit reserving for dividends.

1.4 Earnings Pattern

Another clue to help us classify products is through the pattern of earnings. Section §32 of the SOP reads:

> ... The dividend feature causes the contracts covered by this SOP to more closely resemble contracts in which the earnings emerge in relation to margins rather than contracts in which earnings emerge proportional to premium. ... Earnings on these products, after annual policyholder dividends, tend to emerge as the margin recognized on investment, mortality and expenses.

This is clearly true for example 1 (a three-factor formula plus a lapse component), and example 2 (80% of a three-factor formula).

Again, this is less clear for example 3 (50% of an interest dividend); its cash flows are somewhere between par and non-par products. One may argue example 3's cash flows may most resemble FAS 97 cash flows, since it is "interest sensitive," and as such it would best be covered under FAS 97. However, the nature of this product is more traditional then not. It is a standard ordinary product with a small dividend, it is not interest sensitive in the sense that an interest sensitive fund builds up. No one would classify a three-factor dividend product as "interest sensitive," yet its dividends are a function of interest rates. Accordingly, the traditional character of this product leads to the conclusion that the best way to cover example 3 is by using FAS 60 with explicit reserving for dividends.

Example 4, 1% of a traditional three factor formula, has cash flows like FAS 60 type products, which is further evidence that it should not be included in this SOP.

What about Example 5 where dividends dependent on exterior factors? It has cash flows like those considered by this SOP, that is, its earnings are margins on investment, mortality, and expenses. It behaves like a regular traditional par product. Why not include

it? The reason is that it behaves like a traditional par product only if the company's experience is exactly that of the indexes. If the company investment returns are greater than the bond index, or if the company's expenses are out of control, these factors will be absorbed by the company and not passed on to policyholders. This company's earnings are "margins on investment, mortality and expenses" as stated in the SOP, but not margins in the sense intended by the SOP. Its margins are spreads over the external benchmarks not margins over those passed onto policyholders. Thus, once again we would reject this product.

Part II - Over-Reserving

2.0 Over-Reserving - Overview

The SOP asserts that the policyholder liability should be computed with the dividend fund rate and cash value mortality. The theory is that any interest in excess of the dividend rate, or any mortality less than the cash value rate, will be returned to the policy holder in the form of dividends.

This may be interpreted to mean that this method is approximately equivalent to reserving at realistic interest rates and mortality and holding a separate reserve for dividends. That is, the SOP's implicit reserving for dividends (by using conservative assumptions) should approximate FAS 60[2] with explicit reserving for dividends.

The question that this point raises is, are the above reserves in fact equivalent? This question is discussed in Parts 2.1-2.5 where it is concluded the answer is **YES**. They are highly correlated and very close (within 5%), thus, for our purposes equivalent. This equivalence holds if we use the three factor dividend formula or any formula that passes most experience to the policyholder.

However, if significantly less experience is passed to the policyholders, the SOP's method of reserving causes excess reserves to be held. This is shown in Parts 2.1 and 2.7.

2.1 Ramification of Over-Reserving to Product Classifications

In Example 1 the excess reserves would not be noticeable, since (hopefully) $w^{(E)}$ is close to $w^{(D)}$ and CV_t is close to ${}_tV$. In example 2 the two reserving methods, FAS 60 and SOP, would also be very close since most experience is passed on the policyholder.

Example 3 is a realistic dividend formula, although its dividends are low (presumably such a company's premiums would be low as well). The details of comparing the FAS 60 and SOP methodologies for this example can be found in the Part 2.7. The results are

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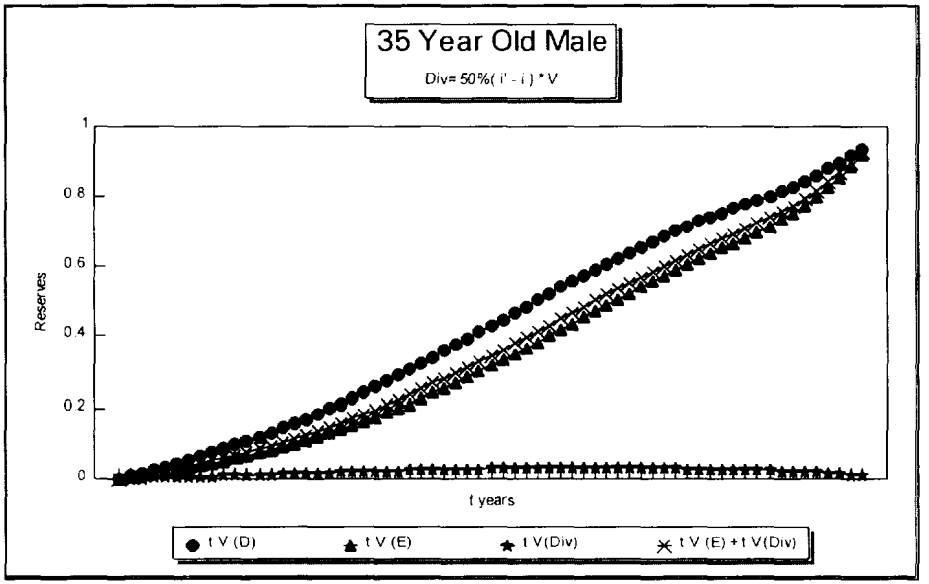
[2] FAS 60 requires the use of realistically conservative assumptions. The difference between realistically conservative and realistic is realized as profit (release from conservatism). Thus, realistic means realistic in the FAS 60 sense. This is the correct interpretation to take since these are the assumptions usually used in a dividend formula (i.e., the (E) is realistically conservative). That is, an insurance company usually credits policyholder dividends with realistically conservative assumptions and keeps the excess release of conservatism as profit.

sobering: the average (over all durations) percentage difference between the SOP mandated formula and the reserves actually needed[3] (FAS 60) are 26%, 16% and 20% for ages 20, 35, and 50 respectively, and the maximum absolute difference in reserves per $1000 insurance is $97, $90, and $80 respectively. Below is a graph of the age 35 case. tV(D) is the SOP mandated formals, tV(E)+tV(Div) is the reserve actually needed.



As can be seen, for a product that passes over less than a full asset share or full three factor formula, the SOP would require that we hold excess reserves. This is the over-reserving problem.

This is another, and perhaps most important, reason that example 3 should not be covered under the SOP. The financial ramifications of reserving under the SOP methodology are acute. Under FAS 60 this product would not have this over-reserving problem, since dividends would be explicitly reserved for. Hence, we will now conclusively state that example 3 should not be covered under the SOP.

Example 4 obviously would have a huge over-reserving problem - thus increasing the evidence that it is not a SOP product.

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[3] I refer to the FAS 60 reserves as the amount actually needed, since this method has an explicit dividend reserve, using projections of expected dividends.

2.2 The Question of Reserve Equivalence

The question that is being addressed is: Is the SOP reserving methodology equivalent to FAS 60 methodology with explicit reserving for dividends? Recall that the SOP stated (§46) that:

> ... The liability determined, based on guaranteed benefits, provides an appropriate measure of the liability to policyholders because, to the extent experience is more favorable than the guarantees, the company pays the difference to policyholders in dividends.

In short, the two reserving methods are not equal in the strict mathematical sense but they are equal in an empirical sense. Thus, for practical purposes they are the same.

What follows is a discussion of the experiments conducted and their results. The question can be stated as follows:

$$ {}_tV^{(D)} \stackrel{?}{\approx} {}_tV^{(E)} + {}_tV^{(Div)} \quad \forall t $$

where,

${}_tV^{(D)}$ is the benefit reserve using the dividend assumptions (i.e., conservative SOP assumptions).

${}_tV^{(E)}$ is the benefit reserve using the experience assumptions (i.e., FAS 60 assumptions).

${}_tV^{(Div)}$ is the reserve for dividends using the experience assumptions (i.e., FAS 60 explicit reserve for dividends).

2.3 Methodologies

Two interpretations of the above formula were tested. They differ in the interpretation of premium.

Method 1: $P^{(D)}$ is set at the net level premium such that ${}_0V^{(D)}=0$, and ${}_tV^{(E)}+{}_tV^{(Div)}$ is computed using $P^{(D)}$ as the premium. This method was chosen so that different net premiums would not distort the results. In chart 1, ${}_tV^{(E)}$ was computed using $P^{(D)}$ as its premium, and ${}_tV^{(Div)}$ has no offsetting premium. Formulaically,

$$ P_x^{(D)} = \frac{A_x^{(D)}}{\ddot{a}_x^{(D)}} \quad , \quad {}_tV_x^{(D)} = A_{x+t}^{(D)} - P_x^{(D)} \ddot{a}_{x+t}^{(D)} $$

$$ {}_tV_x^{(E)} \quad , \quad {}_tV_x^{(Div)} = \left(A_{x+t}^{(E)} + \sum_{s=0}^{\infty} v_{(E)}^{s} \, {}_sp_{x+t}^{(E)} Div_{t+s} \right) - P_x^{(D)} \ddot{a}_{x+t}^{(E)} $$

Method 2: ${}_tV^{(D)}$, ${}_tV^{(E)}$, and ${}_tV^{(Div)}$ where each computed with their own net level premiums. Thus there are three premia: $P^{(D)}$, $P^{(E)}$, and $P^{(Div)}$. This method is consistent with FAS 60

methodology. $P^{(D)}$ was between 2% and 10% larger than $P^{(E)} + P^{(Div)}$. In formulas,

$$P_x^{(D)} = \frac{A_x^{(D)}}{\ddot{a}_x^{(D)}}, \quad P_x^{(E)} = \frac{A_x^{(E)}}{\ddot{a}_x^{(E)}}$$

$$P_x^{(Div)} = \frac{\sum_{t=0}^{\infty} v_{(E)}^{t} \, {}_tp_x^{(E)} Div_t}{\ddot{a}_x^{(E)}}$$

$${}_tV_x^{(D)} = A_{x+t}^{(D)} - P_x^{(D)} \ddot{a}_{x+t}^{(D)}, \quad {}_tV_x^{(E)} = A_{x+t}^{(E)} - P_x^{(E)} \ddot{a}_{x+t}^{(E)}$$

$${}_tV_x^{(Div)} = \sum_{s=0}^{\infty} \left(v_{(E)}^{s} \, {}_sp_{x+t}^{(E)} Div_{t+s} \right) - P_x^{(Div)} \ddot{a}_{x+t}^{(E)}$$

2.4 The Experiments

The experiment was conducted with the dividend assumptions set at 1980 CSO male table, and 6% interest. The experience assumptions were 70% of 1980 CSO male, and 8% interest. The dividend was set at:

$$\begin{aligned} DIV_t &= (i^{(E)} - i^{(D)}) * {}_tV^{(E)} + (q^{(D)} - q^{(E)}) * (1 - {}_tV^{(E)}) \\ &= (8\% - 6\%) * {}_tV^{(E)} + (q^{(CSO)} - .7q^{(CSO)}) * (1 - {}_tV^{(E)}) \\ &= 2\% * {}_tV^{(E)} + 30\% * q^{(CSO)} * (1 - {}_tV^{(E)}) \end{aligned}$$

Both methods were done on males ages 20, 35, and 50.

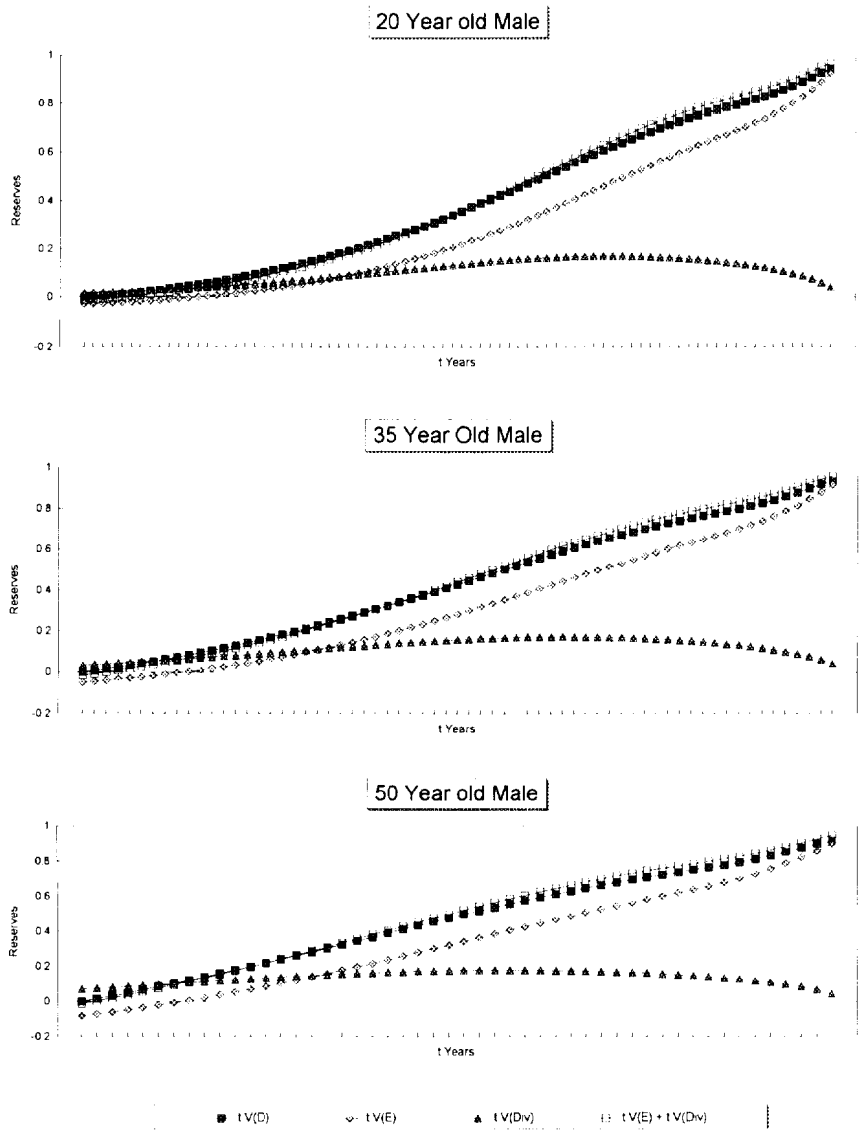
2.5 Results

Using the first method resulted in the average percent difference (taken over all durations) between ${}_tV^{(D)}$ and ${}_tV^{(E)} + {}_tV^{(Div)}$ as 8.74%, 2.09% and 2% for ages 20, 35, and 50 respectively. The maximum absolute difference per $1000 of insurance was $33, $34, and $36 respectively. See Chart 1. Note how tV(E) and tV(D)+tV(DIV) lie right on top of each other.

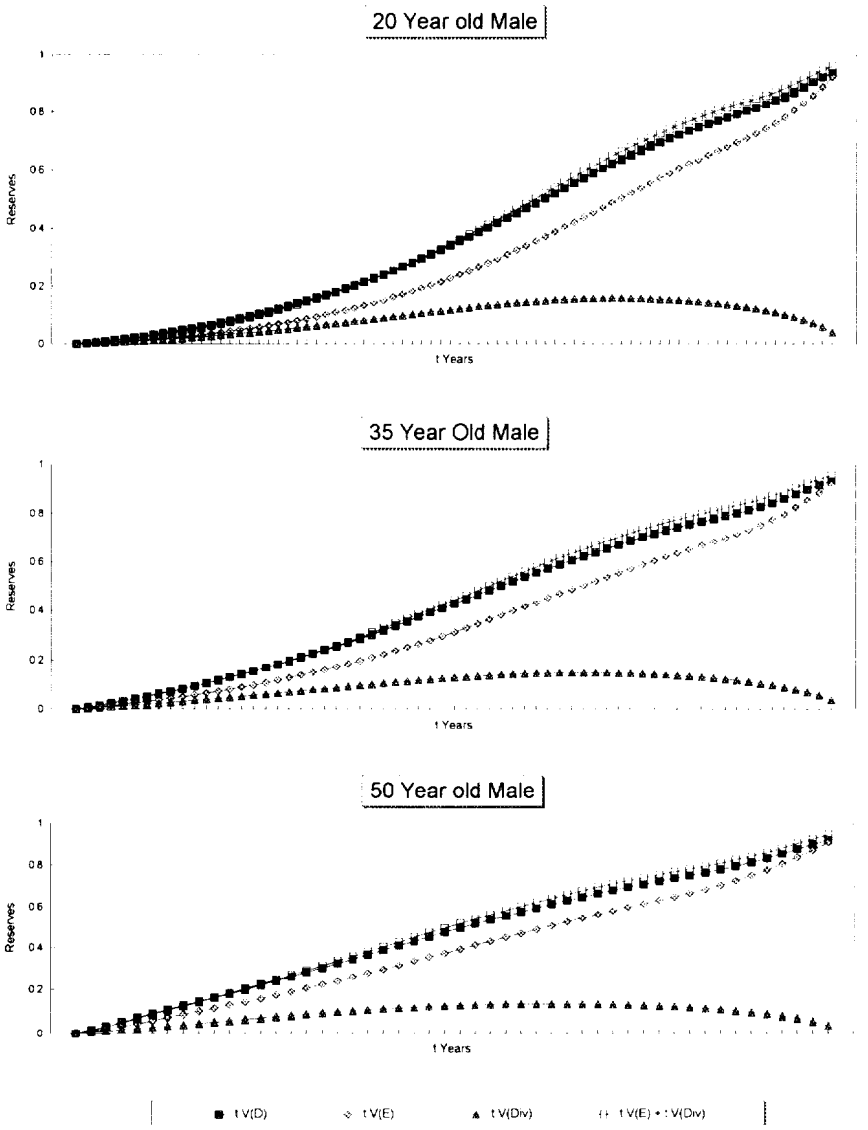
Method 2 yielded even closer results. The average percent difference between ${}_tV^{(D)}$ and ${}_tV^{(E)} + {}_tV^{(Div)}$ was .67%, 2.01%, and 3.35% for ages 20, 35, and 50 respectively. The maximum absolute difference per $1000 of insurance was $34, $33, and $31 respectively. The percentage difference of $P^{(D)}$ over $P^{(E)} + P^{(Div)}$ was 9.13%, 4.47%, and .52% respectively. See Chart 2. Again, note how tV(E) and tV(D)+tV(DIV) lie right on top of each other.

Method 2 was also tested with actual earned experience being 12% and experience mortality at 60% of 80CSO. The results were as good for ages 35 and 50 with the percent difference of 6.84% and 1.45% and maximum absolute differences per thousand dollar of insurance of $37 and $16 respectively. The results for the age 20 case were not as good, the percentage difference was 20% the absolute per $1000 difference was $80.

Charts 1 - Method 1



Charts 2 - Method 2



2.6 Reserve Equivalence Conclusion

While reserving based on the dividend assumptions is not identical to reserving using realistic assumption and reserving for dividends, it is empirically close. More importantly in the context of our discussion from this point forward we will assume they are equivalent.

2.7 Over-reserving ramifications - Example 3

Problems arise when not all of the excess experience is passed on to the policyholder. In particular, ${}_tV^{(D)}$ and ${}_tV^{(E)} + {}_tV^{(Div)}$ are then very different. This is because ${}_tV^{(D)}$ assumes all experience would be passed on to the policyholder whereas ${}_tV^{(Div)}$ would be what is actually expected to be passed on.

To illustrated this, Chart 3 have been prepared. Chart 3 are the same as Chart 2 except that the dividend formula used was $DIV=.5*(i^{(E)}-i^{(D)})*{}_tV^{(E)}$, that is, there is no mortality dividend and only 50% of the investment risk is passed on to the policyholder. The results are sobering. The average percentage difference (again, taken over all durations) is 26%, 16% and 20% for ages 20, 35, and 50 respectively, and the maximum absolute difference per $1000 insurance is $97, $90, and $80 respectively.
The percent difference is largest for the lower durations and decrease with time. The percent difference at duration one is 51%, 39%, and 30% for ages 20, 35 and 50 respectively. Thus, the impact of over-reserving is greatest at the most important time. In other words, the over-reserving problem greatly exacerbates surplus strain. This would have the effect of depressing earnings in the early years, but increasing them in the later years. This pattern of earnings would be artificial and a product of a faulty reserving basis.

Thus we conclude, in no uncertain terms, that the method for reserving required by the SOP is good for any dividend formula that passes most of the company's experience onto the policyholder (such as the three factor dividend formula) but the SOP over-reserves for products that pass less risk over to the policyholders.

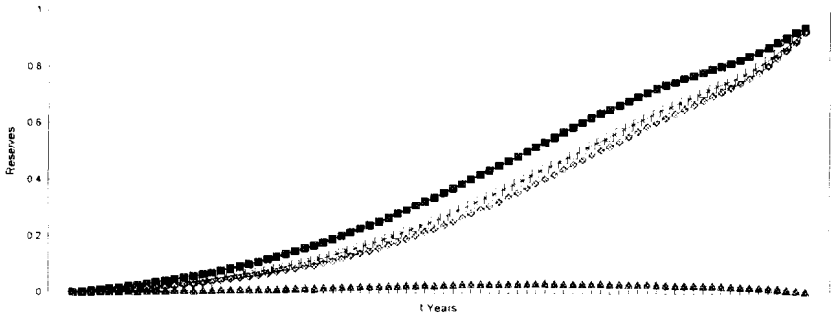
2.8 A possible over-reserving solution

There is a solution to this over-reserving problem - if instead of reserving at the dividend assumptions, when $\alpha<100\%$ or $\beta<100\%$ we reserve at $i^{(res)}=\alpha i^{(D)}+(1-\alpha)i^{(E)}$ and $q^{(res)}=\beta q^{(D)}+(1-\beta)q^{(E)}$ then $V^{(res)}$ would be approximately equal to $V^{(E)}+V^{(Div)}$ and we would not be over reserving.

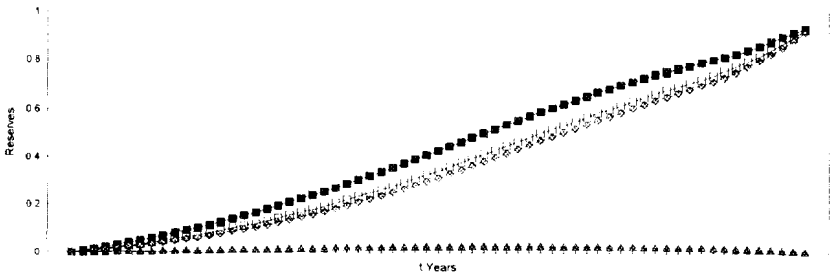
These assumptions are a just straight linear interpolation between the dividend assumptions and the actual experience. But they lend themselves to a very nice interpretation; when α and β are 100%, this is a traditional par product and thus we reserve using the SOP mandated methodology; when α and β are 0% this is a traditional non-par product and we reserve at a FAS 60 realistic rate. When α and β are somewhere in

Charts 3
Div = 50% (i' - i) * V

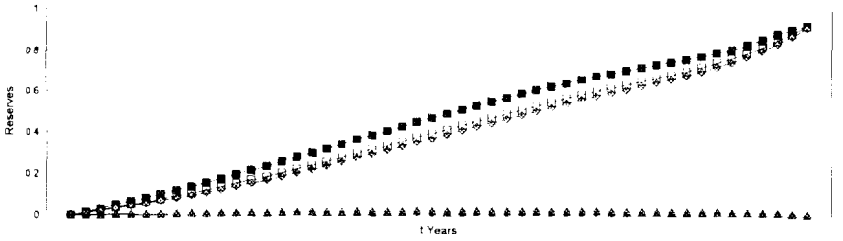
20 Year old Male



35 Year Old Male



50 Year old Male



between, we split the difference. Thus, we are in effect interpolating between FAS 60 and the SOP.

Unfortunately, while this solution is in the spirit of the SOP, it is an extremely loose interpretation to take.

Part III - Miscellaneous Observations

3.1 SOP Valuation Mortality

The term "dividend assumption" has been taken to mean the conservative dividend fund assumptions (valuation assumptions). This is no problem for the interest rate since the dividend interest rate is (almost) always the valuation (statutory or pricing) interest rate. However, the mortality rate mandated by the SOP is the mortality used to set the guaranteed cash values. There is still no problem if the dividend mortality and the cash value mortality are the same, as they usually are, and was (presumably) assumed by the SOP. If they are different, problems may arise.

Some companies have different dividend mortality than cash values mortality. The SOP does nothing to address this. It would seem that it is in the spirit of the SOP to use the dividend mortality in such a case. However, the SOP is quite unambiguous when delineating which mortality table to use: "mortality rates guaranteed in calculating the cash surrender values described in the contract [should be used]" (§16). I am of the opinion that the wording is concrete in this respect - thus cash value mortality should be used.

As implied is Part II above, if the dividend mortality is lower than the cash value mortality we will be over-reserving because the theory that the excess will be returned to the policy holders is violated.

3.2 Negative Gross Margins

The SOP states (§20):

> If significant negative gross margins are expected in any period, the present value of gross margins before annual dividends, estimated gross premiums, or the balance of insurance in force should be substituted as the base for computing amortization.

We need to clarify, does this apply if gross margins are negative in the first or second year? How large is "significant?"

I would interpret the section to mean that if the absolute value of negative gross margins is greater than 10% of net level premiums for three or more years then another margin should be sought. Otherwise, zeroing out the negatives in those few years should be done.

However, if in the first or second year the gross margins are negative, even by a relatively large amount, I would not apply this section. If margins are negative in the first or second year, two things can be done:

1. Amortize the deferable acquisition costs (DAC) with respect to gross margins as usual, and have negative amortization in the first or second year. Thus, we are in effect deferring more acquisition costs. However, this is problematic, since we are not supposed to defer more than the deferable acquisition costs.

2. Amortize the DAC with respect to gross margins setting the negative gross margins equal to zero. In effect, we defer amortization to the first non-negative year.

3.3 Dividend Options

SOP §23 addresses the issue of dividend options:

> In estimating gross margins, insurance enterprises should use the best estimate of the dividend options that policyholders will elect.

Thus, the estimated gross margins should include the margins from dividend options. For example, if the option chosen is dividend accumulation with interest, the estimated gross margins from these accumulations should be included in the EGMs. Since such margins are large later in a policy's life when large accumulations have developed, this will have the effect of deferring the DAC longer.

The correct interpretation to §23 is probably that a weighted average of all dividend options should be used in estimating the EGMs. That is, the actuary should make an assumption such as 50% of the policyholders elect paid up additions, 30% dividend accumulations with interest, and 20% elect dividends in cash.

In practice this is hard to implement, and keeping track of the dividend options would prove difficult. It is not an unreasonable interpretation to assume all dividends are paid in cash. This simplifies the calculations significantly and can be justified on the basis that it is hard to predict policyholder dividend options, and that paying them out in cash is conservative since it defers less DAC.

Appendix - Overview of the SOP GAAP for Mutuals

A.1 Conditions

The SOP states (§5) that it is applicable to products issued by mutual companies or their stock subsidiaries that satisfy both of the following conditions:

a. They are long-duration participating contracts that are expected to pay dividends to policyholders based on actual experience of the insurance enterprise.

b. Annual policyholder dividends are paid in a manner that identifies divisible surplus and distributes that surplus in approximately the same proportion as the contracts are considered to have contributed to divisible surplus (commonly referred to in actuarial literature as the *contribution principle*).

FAS 97 applies to investment contracts[4], limited-payment contacts not included above, and universal life-type contracts. Universal life insurance is characterized by flexibility and discretion granted to one or both parties to the contract. Deferable acquisition costs (DAC) are amortized in proportion to estimates of gross profits.

FAS 60 applies to short duration contracts, and to long duration contracts not included in this SOP or FAS 97. DAC is amortized in proportion to premium.

FAS 113 applies to reinsurance contracts.

A.2 Reporting Method

For contracts covered under the SOP the following reporting method is required:

- Premiums are reported as revenue when due from policy owners. (§12)
- Death and surrender benefits paid are reported as expenses. (§13)
- Dividends are reported as expenses, based on estimates of the amount incurred for policies in force for the period. (§14)

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[4] This includes policies that the probability of life-contingent payments is "remote," or the ratio:

PV(life-contingent payments)/PV(all payments)

is "insignificant." No definition of "remote" or "insignificant" is provided in FAS 97 but 10% and 5% seem appropriate.

- Increases in the liability for future policy benefits should be reported as an expense. (§18)

- Deferred acquisition cost (DAC) should be amortized over the life of the policy at a constant rate based on the expected gross margins. (§20)

A.3 Liability

The liability for future benefits is the sum of (§15):

a. Net level premium reserves for death and endowment policy benefits.

b. The liability for terminal dividends.

c. Any probable loss (premium deficiency).

A.3.1 Net Level Premium Reserve

Net level premium reserves are to be calculated based upon the dividend fund interest rate, and guaranteed cash value mortality (§16). The dividend fund interest rate is the valuation interest rate used in the setting of dividends, that is, the standard against which experience is measured. This would generally be a low interest rate[5,6]. Similarly, the guaranteed cash value mortality would usually be high.

Net level premium reserves are the present value of guaranteed death and endowment benefits less the present value of net premiums. Net premiums are a constant ratio of the gross premiums. The ratio is set such that at issue, the present value of all death and endowment benefits is equal to the present value of the net premiums. Expenses and lapses are not considered explicitly (Glossary of SOP).

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[5] N.B. We shall refer to this rate as the dividend interest rate and denote it $i^{(D)}$. Similarly, dividend mortality is the valuation mortality and will be referred to as $q^{(D)}$. This terminology is consistent with the SOP.

[6] If a dividend fund interest rate is not identifiable, the cash value interest rate, non-forfeiture interest rate, or minimum cash value interest rate as determined by the NAIC model law for the years of issue should be used (in order of preference).

The theory for using this interest rate and mortality is that the liability determined based on guaranteed benefits provides an appropriate measure of the liability to policyholders since, to the extent experience is more favorable than the guarantees, the company pays the difference to policyholders in dividends (§46). The validity of this theory is examined in depth in Part II of the paper.

A.3.2 Terminal Dividend Reserve

The liability for terminal dividends should accrue over the life of the policy at a constant rate with respect to the present value of the estimated gross margin (§17). (The estimated gross margin is explained below). The theory for including a liability for terminal dividends is that the rights to terminal dividends accumulate to policyholders over the life of the products. Thus, the event that creates the liability is the continued payment of premiums (§51). Terminal dividends are only reserved for if (a) payment of the dividend is probable and (b) the amount can be reasonably estimated (§17).

A.3.3 DAC

Deferrable acquisition costs are those defined in FAS 60 (§19). The interest rate used to amortize the DAC is the expected investment yield used in computing estimates of gross margins[7,8] (§20). Interest should accrue to the unamortized balance of the DAC at the same rate. Estimates of expected gross margins should be done regularly and the amortized portion of the DAC should be adjusted (i.e., the DAC should be unlocked). The interest rate used in the revision should be either the original rate used **or** the latest estimate of expected investment yields. Whichever method chosen should be used consistently in all subsequent revisions (§21).

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[7] If significant negative gross margins are expected in any period, the present value of gross margins before dividends, estimated gross premiums, or the balance of insurance in force should be substituted as the base for computing amortization (§20).

[8] Note that this is a departure from FAS 97. FAS 97 requires that the interest rate used to amortize the DAC is the rate credited to the policyholder balances. This rate is generally lower than the earned rate.

A.4 Estimated Gross Margins

The estimated gross margin	=	Expected Premiums
	+	Expected Investment Income on the Net Level Premium Reserve[9]
	-	Expected Benefits
	-	Expected administrative expenses (including non-deferable acquisition expenses)[10]
	-	Expected change in Net Level Premium Reserve
	-	Expected Dividends (except terminal dividends)
	+/-	Expected other

Estimated gross margins should be determined on a best estimate basis, without provision for adverse deviation. (§22)

In estimating gross margins, insurance enterprises should use the best estimate of the dividend options that policyholders will elect. (§23)

Gross margins under this SOP are comparable to the gross profit calculation in FAS 97 for UL-type products. (§54-58)

A.5 Unlocking

As mentioned earlier, the estimates of expected gross margins should be done regularly and the amortized portion of the DAC should be adjusted. This is commonly called unlocking. Recalculating the DAC both retrospectively and prospectively involves going back to the beginning of the policy and calculating the DAC based upon our new experience and projected new assumptions. The difference in the DAC is a gain (or loss) in the current year's GAAP profit. Thus, unlocking is not taken lightly.

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[9] Note FAS 97 is unclear in this regard. Tan's Interpretation 2 (Source-of-Earning Analysis Under FAS 97 (TSA XLI)) is that investment income in FAS 97 is on the beginning of year account balance plus the change in cash flow during the year. Since the SOP is very clear in delineating that investment income is on the net level premium reserves, I would have to conclude that Tan's Interpretation 2 should be rejected for the SOP and that interest on cash flows should be excluded from the EGMs.

[10] Again, FAS 97 is unclear in this regard. Tan's Interpretation 1 is that non-deferable acquisition costs are included in the EGPs. Similarly, the AICPA has mandated that they be included in the EGM here.

Unlocking does not have to be done every year-end per se, but it should be considered yearly[11]. Regardless of assumptions changes, if dividends change (significantly) the DAC needs to be unlocked since the DAC is amortized according to the estimated gross margins which is a function of expected dividends. The liability for terminal dividends should also be changed if the terminal dividends are expected to change (significantly).

[11] For a start up operation there may not be enough data to unlock for several years, in which case pricing assumptions should be used until enough data is made available.

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