Memorandum

Tillinghast – Towers Perrin

DATE: June 22, 2001

TO: SEAC Workshop Participants

FROM: Marc Altschull – Tillinghast FS/Atlanta
Doug Robbins – Tillinghast FS/Atlanta

RE: STAT IRR TO GAAP ROE: HOW DO WE GET THERE?

DESCRIPTION

With the surging importance of the equity markets and the resulting shift in focus from Statutory to GAAP reporting, the insurance industry has been experiencing a transition in the primary "profitability measure of interest." In this workshop we will begin with an explanation of Statutory IRR and GAAP ROE, including the differences and similarities between these measures. Then by way of a variable annuity example, we will demonstrate the near equality, over the life of the product, of these measures of profitability.

AGENDA

I. What's the importance to you?

II. Define IRR and ROE

III. Demonstrations

  A. ROI = ROE_t for all t

  B. Reason 1 doesn't work that way in practice: DAC amortization

  C. Reason 2 doesn't work that way in practice: Other modifications to GAAP Equity

IV. IRR = $f(ROE_t)$

V. Discussion of results/Questions

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FROM: Marc Altschull – Tillinghast FS/Atlanta

RE: DEVELOPMENT OF RELATIONSHIP BETWEEN STAT IRR AND GAAP ROE

Begin with the accepted formula for IRR (Beal, North American Actuarial Journal, Volume 4, Number 4):

$$IRR = PV(\text{GAAP Profit}) \,/\, PV(\text{GAAP Surplus})$$

Let P_t = GAAP Profit in year t
S_t = GAAP Surplus in year t

$PV(\text{GAAP Profit}) = ?\ P_t * (1 + IRR)^{-t}$

and

$ROE_t = P_t \,/\, S_t$

therefore

$PV(\text{GAAP Profit}) = ?\ S_t * ROE_t * (1 + IRR)^{-t}$

FINALLY...

$IRR = ?\ w_t * ROE_t$ where $w_t = S_t * (1 + IRR)^{-t} \,/\, PV(\text{GAAP Surplus})$

IRR equals weighted average of annual ROE's, where the weights are the ratio of the BOY GAAP Surplus discounted at the IRR to the beginning of the projection divided by the value of the BOY GAAP Surplus in each year at the beginning of the projection.