

# VANISHING PREMIUM ILLUSTRATIONS REVISITED

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## ABSTRACT

The NAIC's "Life Insurance Illustrations Model Regulation," which goes into effect on January 1, 1997, is largely a response to the perceived misrepresentations in life insurance illustrations, of which vanishing premiums is a notorious example. The NAIC was so disenchanted with vanishing premium contracts that the regulation expressly required that "... an insurer or its producers or other authorized representatives shall not ... [U]se the term "vanish" or "vanishing premium," or a similar term that implies the policy becomes paid up, to describe a plan for using non-guaranteed elements to pay a portion of future premiums ... "

From an actuarial perspective, this state of affairs presents an interesting challenge. Rather than disallowing illustrations of "risky" contracts, why not develop an illustration for potential policyholders which adequately conveys the essence of these contracts and their probabilistic nature. The purpose of this paper is to discuss some preliminary observations related to the development of such illustrations.

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"How, even in hindsight, does one measure the reliability of a set of illustrations?"  
-- E. Jack Moorhead, *TSA* (1978), p. 485.

## INTRODUCTION

### The Vanishing Premium Concept

A simple representation of the vanishing premium concept<sup>1</sup> is shown in Figures 1(a) and (b). In Figure 1(a), there is an insurance contract under which premiums ( $G_t$ ,  $t=0,\dots,4$ ) are paid at the beginning of each year during the first five years of the contract. Based on the anticipated outlook, these premiums are likely to produce a dividend stream ( $\tilde{D}_t$ ,  $t=1, \dots, 5, \dots$ ) which is somewhat less than is currently used for insurance cost illustrations. ( $\sim$  implies a random variable)

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<sup>1</sup>As actually implemented, dividends were often accumulated in the form of paid-up insurance, and the cash values of the additional insurance was then used to offset subsequent premium payments.

Figure 1(a)  
A Simple Representation

0	1	2	3	4	5
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$G_0$	$G_1$	$G_2$	$G_3$	$G_4$	
	$\tilde{D}_1$	$\tilde{D}_2$	$\tilde{D}_3$	$\tilde{D}_4$	$\tilde{D}_5$

If one could assume that the current dividends<sup>2</sup> would continue, the dividend stream would be as represented in Figure 1(b). That is, the dividends would be larger and, assuming they were not paid out, would be sufficient to offset the premium due at time 4, and thereafter.

Figure 1(b)  
The Implications of Current Dividends

0	1	2	3	4	5
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$G_0$	$G_1$	$G_2$	$G_3$	<del><math>G_4</math></del>	
	$\tilde{D}_1$	$\tilde{D}_2$	$\tilde{D}_3$	$\tilde{D}_4$	$\tilde{D}_5$

This notion which involves the elimination of the requirement to pay premiums is known as the "vanishing premium" concept.

The vanishing premium concept is not new, of course, policies such as n-pay life have a long history of use.<sup>3</sup> What is new is that in these cases the duration at which the premiums become paid up is a random variable, and the insured is on the risk.

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<sup>2</sup>Actuarial standards for dividend illustrations have focused on current experience. In the American Academy of Actuaries, "Recommendations of the Committee on Dividend Principles and Practices," which was adopted in 1980, for example, Recommendation 20 required that "The actuary's primary professional responsibility with regard to illustrated dividends is to ensure that the dividends appropriately reflect the current financial results of the company and are related to paid dividends in an equitable, justifiable manner."

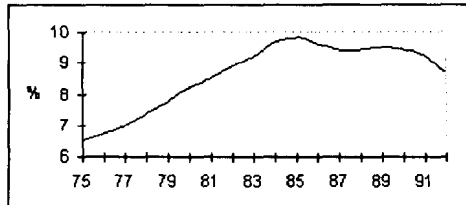
Many states have had similar requirements. While these requirements varied by state, those that were generally applicable included the requirement that, if dividends or other non-guaranteed elements were illustrated, the illustration normally had to use the insurer's current dividend scale or current interest rate, mortality charges, and expense charges.

<sup>3</sup>See, for example, George King (1887), *Institute of Actuaries' Textbook* (London: Charles and Edwin Layton), Articles 122 and 123.

## The Vanishing Premium Problem

The source of the vanishing premium problem is easily recognized if one considers the portfolio rates of the life insurance industry since 1975. As shown in Figure 2, the rates were on the rise until 1985, so that the dividend illustrations based on then current experience were less than the actual declared dividends during the subsequent period.

Figure 2  
General Account  
Net Yield on Investment Income



Source: ACLI

However, the rates fell thereafter, so that, after a lag, the dividend illustrations based on current experience exceeded the dividends which would subsequently be paid. Unfortunately, since the industry had a long history of always paying more than illustrated, policyholders anticipated that this practice would continue. Thus, the vanishing premium problem occurred because the expectations of policyholders were inconsistent with the probable outcome, and the problem erupted when they realize this situation.<sup>4</sup>

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<sup>4</sup>The recent litigation attests to the magnitude of this problem. In the following table, for example, while this is only four of the companies involved, it is clear that the awards involved are substantial.

**Examples of Litigation Awards**

Company	Approx. Award
New York Life Insurance Company	\$65M
Manufactures Life Insurance Company	\$10M
Crown Life Insurance Company*	\$10M
Prudential Insurance Company	\$35M

\* Ultimate award.

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### **Purpose of this Study**

As part of the industry response to the vanishing premium problem the Society of Actuaries formed a task force to document the problem and to make recommendations as to how the problem might be resolved.<sup>6</sup> A major recommendation was the following:<sup>7</sup>

We would recommend that the actuarial profession renew its efforts to develop appropriate methodologies or indexes on which to compare products and companies.

The purpose of this study is to discuss how this methodology could be developed. While the focus here is on vanishing premiums, the goal is a methodology which is general enough to be applied in any situation of this type.

## **PRELIMINARY OBSERVATIONS**

This section discusses some preliminary observations regarding a potential methodology for comparing life insurance products and companies. The topics include dividends as random variables, the dividend process, a performance index, and a decision model.

### **Dividends as Random Variables**

It is a simple matter to modify net cost methods to incorporate a stochastic process. Figure 3, for example, shows such a representation for the elements of the interest adjusted cost method. As indicated, there are gross premiums payable at the beginning of each year, dividends, which are random variables, payable at the end of each year, the cash value at the end of the planning horizon, and the terminal dividend, if any, at the

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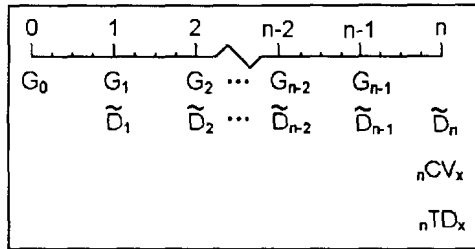
<sup>5</sup>NAIC (1996) Life Insurance Illustrations Model Regulation, Section 6(B)(8).

<sup>6</sup>See Society of Actuaries, "Final Report of the Task Force for Research on Life Insurance Sales Illustrations," TSA 1991-92 Reports.

<sup>7</sup>TSA 1991-92 Reports, p. 178.

end of the planning horizon.<sup>8</sup>

Figure 3  
Net Cost of Insurance



Thus, in part, the problem becomes one of developing a stochastic cost model which captures the essence of the distribution of dividends.

### The Dividend Process

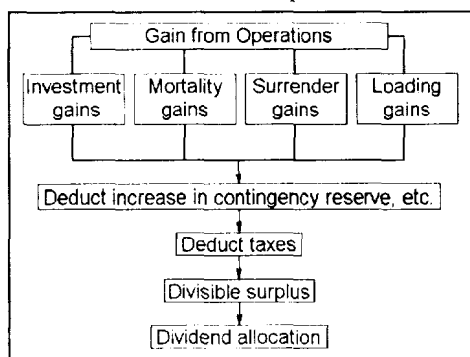
The source of the dividends payable to policyholders is the divisible surplus of the company. Generally speaking, this divisible surplus can be depicted as shown in Figure 4:

<sup>8</sup>The equations underlying the interest adjusted cost (IAC) and the interest adjusted premium (IAP) methods then become the basis for cash flow analysis:

$${}_n\tilde{I}AC_x = \frac{\sum_{t=0}^{n-1} G_t (1+i)^{n-t} - \sum_{t=1}^n \tilde{D}_t (1+i)^{n-t} - {}_nCV_x - {}_nTD_x}{\dot{s}_{\bar{n}}}$$

$${}_n\tilde{I}AP_x = \frac{\sum_{t=0}^{n-1} G_t (1+i)^{n-t} - \sum_{t=1}^n \tilde{D}_t (1+i)^{n-t}}{\dot{s}_{\bar{n}}}$$

Figure 4  
Divisible Surplus



As indicated, there are four primary sources of gains from operations<sup>9</sup>:

Investment gains = net investment income - interest required on reserves;

Mortality gains = expected mortality cost - (claims - reserves released by death);

Surrender gains = reserves released by surrenders - cash value paid; and

Loading gains = gross premiums - net premiums - expenses.

These gains from operation are reduced by increases in the MSVR, contingency reserves, unallocated surplus, and nonadmitted assets and taxes to derive divisible surplus, and, from there the dividends to be allocated to the insureds.

### A Performance Index

There are a number of approaches for assigning weights to competing causal factors that may be appropriate here.<sup>10</sup> However, a first approximation might focus on investment returns.

The Society's "Individual Life Insurance Dividends" Study Note<sup>11</sup>, for example, as shown

<sup>9</sup>The 3-factor contribution formula nets out the surrender gains from the loading gains.

<sup>10</sup>For some current thoughts on this topic see Edward W. Frees, "Relative Importance of Risk Sources in Insurance systems," in this *Proceedings*.

<sup>11</sup>SOA Study Note 340-33-89, p. 46.

in Table 1, portrays the investment gain as comprising 89 percent of the total gain.<sup>12</sup>

Table 1  
Relative Size of Gain by Source

Interest	89%
Mortality	4%
Surrender	3%
Loading-expenses	4%

This portrayal of relative importance of factors is validated in Table 2, equivalent impact, which was presented during a panel discussion.<sup>13</sup>

Table 2  
Equivalent Impact

$\Delta$ Interest	0.5%
$\Delta$ Mortality	30.0%
$\Delta$ 1st Year Commissions	45.0%

As indicated, the conclusion was that a 0.5 percent change in the interest rate was equivalent to a 30 percent change in mortality or a 45 percent change in first year commissions.

Based on observations of this sort, it may be sufficient to use a performance index based strictly on investment returns.<sup>14</sup> Assuming this to be the case, one goal of this research is to use anticipated trends in investment returns to develop a user friendly performance index with respect to vanishing premiums.

The general nature of such an indicator might be as follows. Assume the net yield on the general account as shown in Figure 2 for the second half of the decade, and that the curve is anticipated to have a downward trend. The vanishing premium situation is

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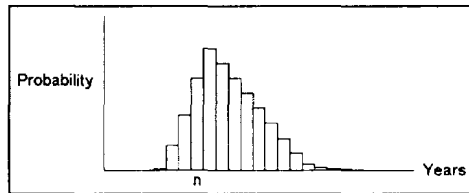
<sup>12</sup>There is, of course, the issue of whether this representation matches that of vanishing premiums or more traditional insurance products.

<sup>13</sup>RSA (1986) 12, p. 3105. The assumption was that the policy was issued to a 35 year old nonsmoking male.

<sup>14</sup>Of course, a more indepth study is needed to validate this conclusion.

easily depicted if one thinks of the time until the premiums vanish as a random variable whose distribution is skewed to the right. Then, for example, as shown in Figure 5, while the dividend based on current experience might suggest that the premiums will vanish after  $n$  years<sup>15</sup>, the probability that the premiums will vanish in  $n$  years or less is relatively low.

Figure 5  
Years Until the Policy is Paid Up



This type of representation has a number of positive attributes, two of the more important ones being that it can be developed from trends and it is relatively easy to interpret. Of course, there are issues, such as the relevance of aggregate values, to be resolved.

### A Decision Model

Regardless of how the performance index is developed, there are qualitative issues to be resolved. The Report<sup>16</sup>, for example, identified the following factors as generally not properly considered in projections:

- The value of the services of an agent or company;
- The relative strength and reputation of the company and its actual dividend performance; and
- *Difference in policy provisions.*

Current optimization methodology can help resolve these issues. Figure 6 shows how one might formulate this decision-making process into a hierarchic structure of objective, criteria, and alternatives.<sup>17</sup>

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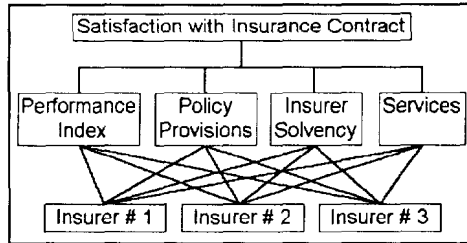
<sup>15</sup>In practice, it was common for policies to show premiums vanishing after 8 years, or so.

<sup>16</sup>TSA 1991-92 Reports, p. 221.

<sup>17</sup>See, for example, Robert Puelz, "A Process for Selecting a Life Insurance Contract," JRI 1991, pp. 138-146.



Figure 6  
Life Insurance Contract Choices



As indicated, the objective is satisfaction with the insurance contract; the criteria are performance index, policy provisions, insurer solvency, and services; and the alternatives are the various potential insurers. Thus, for example, a proxy for the performance index might be based on a general measure of the relationship between investment income and dividends, and a proxy for insurer solvency could be based on Best's Reports or the reports of a comparable rating agency.

### Comment

Despite the Society's task force recommendation that the actuarial profession renew its efforts to develop appropriate methodologies or indexes on which to compare products and companies, the emphasis of its report was focused primarily on disclosure of how policies work and how deterministic scenarios impact policy values. Although the report addressed the issues of projecting future performance and comparative costs, it concluded that reliable answers to these types of issues are not possible using illustrations.<sup>18</sup>

To a large extent, the NAIC's "Life Insurance Illustrations Model Regulation" has embraced this view.

While it is obviously important for policyholders to understand the structural nature of their contracts, it also is important for them to have a sense of how their contracts will perform and how they compare with similar contracts in the marketplace. This research will serve its purpose if it provides some insights in these areas.

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<sup>18</sup>TSA 1991-92 Reports, p. 159.

## REFERENCES

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