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### **SOURCES OF PROFIT ANALYSIS**

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Recorder: JULIANNE HOW SHERRETS

- o Why do a sources of profit analysis?
  - What is profit?
  - Statutory, Generally Accepted Accounting Principles and cash
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  - Interest
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- o How to use profit analysis as a business tool to drive management action

MR. GREGORY D. JACOBS: I am going to moderate and be the first panelist. I am a consulting actuary and an associate member of Milliman & Robertson in Indianapolis.

I have spent a great deal of my time pricing products as well as developing internal and external financial reporting techniques for my clients. Sources of profits analysis has been a technique that we have spent a great deal of time on and I want to share some of my thoughts and ideas with you.

The next panelist is Charles McLeod. Charles is with Tillinghast/TPF&C in Toronto. He is a graduate of the University of Waterloo. One of the many

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areas that Charles has worked in is the design of management information systems. His reputation precedes him as he has done very good work in that area.

The final panelist today is Jeff Harper. Jeff is a consulting actuary with Tillinghast/TPF&C in Jacksonville. Jeff's work background is quite varied, but he has worked extensively on product pricing, including both traditional and nontraditional products. That is what I have asked Jeff to talk about; how the sources of profit work that he's done relates to pricing products.

We are all here today to talk about sources of profit analysis. Why? Why did so many people show up for this discussion? Obviously, people are keenly interested in this topic. Are we going to tell you how to make your business more profitable? Probably not! Are we going to tell you some never before found secret profit source, a kind of "Fountain of Profit?" I don't really think that I know of one. I hope you are not disappointed and want to leave the room now. We are not going to find profits that are not there. We are just going to discuss a tool that allows you to analyze profits and maybe get better control over your business.

I am of the opinion that our business, the insurance industry, is in a bit of trouble. Profits are not what they are supposed to be. A lot of companies are having problems. A lot of profits are negative. Why? What do we need to do? I don't think we have enough information to solve some of those problems.

The measuring rod of a normal financial statement of an insurance company is a traditional income statement. Profit is premium and investment income less deaths, surrenders, expenses, taxes and the increase in reserve. What does it tell you? Well, it tells me we collected so much premium and we had so much investment income, and we paid so much in deaths, and on and on. Other than that, it does not tell you much.

What we need is a better income statement. I think that is where we are headed. In my opinion, an ideal income statement should tell us the following things:

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1. How much money did we make? That is quite obvious.
2. Where do profits/losses come from? I think that is a very critical piece of information that we really have not been able to get our hands on.
3. Are there any problem areas? That sure seems to be quite an important piece of information in the financial statement. Your profits are lower than what you expected. Where? Why? What can we do?
4. An ideal statement should tell you how you can fix the problems.
5. Finally, this is the real key, did we increase our value or worth? In other words, did we do good at the end of the day? Are we better off for being in the business at the end of the day? The financial statements we look at on a day-to-day basis do not tell us.

What is the problem with a typical income statement? The increase in reserve element of the financial statement doesn't give enough information. It contains too many pieces of financial transaction information that move in and out and net against each other. Management and accountants have been mystified with the concept of reserves for too long, knowing them only as creatures that come from the actuarial department at valuation time. They understand (I think) why reserves are necessary, but they are not sure what makes up the reserves.

So what do we do? We break the increase in reserve component into its various parts. How do we do that? In statutory accounting, the increase in reserve is the net premium plus tabular interest, minus tabular mortality cost, minus reserves released on death, minus reserves released on surrenders. That looks like Page 6 of the annual statement. It also sounds quite similar to universal life policy mechanics. Virtually all the sources of profit work I have done recently has been a direct result of either universal life product pricing or analyzing universal life financial results.

So how do we get from a typical income statement to a sources of profit statement? What we do is simple algebra.

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We replace the increase in reserve with the various parts. (See figure 1.) The net premium is shown a little bit different, the premium on the top and loading on the bottom. By breaking it out this way you'll see that a lot of terms cancel.

**FIGURE 1**  
**STATUTORY SOURCES OF PROFIT STATEMENT**

Profit =	Premium		- Premium
	+ Investment Income		- Tabular Interest
	- Deaths		+ Tabular Cost
	- Surrenders		+ Reserve Released on Death
	- Expenses and Taxes		+ Reserve Released on Surrender
	- Increase in Reserve		+ Loading

When you rearrange the terms, you get something that's really neat. (See figure 2.) The first element of profit is investment income less tabular interest (or interest credited to the reserve). Look at a universal life case, that is the investment income minus the interest credited to the policy. I call it the interest margin. This is a relevant piece of information in analyzing a product's or a company's profits.

**FIGURE 2**  
**STATUTORY SOURCES OF PROFIT STATEMENT**

Profit =	Investment Income - Tabular Interest (Interest Margin)
	+ Tabular Cost + Reserves Released on Death - Deaths (Mortality Margin)
	+ Reserves Released on Surrender - Surrenders (Withdrawal Margin)
	+ Loading - Expenses and Taxes (Expense Margin)

The second element is tabular cost plus reserves released on death minus deaths. The first two pieces relate to the account value or the reserve. The last piece is how much we have to actually pay out. That tells me if we have charged the policyholders enough and/or if we have set enough aside in our reserves to cover our mortality costs. I call that the mortality margin. This is an important piece of information also.

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The third element is the withdrawal margin. That is a contradiction in terms. I do not know if anyone considers withdrawals as creating profit. In a statutory situation you do. Companies that have gone through massive internal replacement programs, have statutory earnings that look like they are making money because of all the reserves that are released. The withdrawal margin is how much you release on reserve versus how much you pay out, the reserve/cash value differential.

The final element is the loading that comes out of the gross premium less expenses and taxes. I call this my expense margin; again another critical piece of information.

These four elements -- interest, mortality, withdrawals, expenses -- are the key transactional functions in the insurance business. You will notice the words increase in reserve do not appear in the formula. Quite interesting, there is not even the word premium. In the universal life case, premium drives the fund, but premium in itself is not a "source of profit" because it really belongs to the policyholder. The profit comes from the various elements of the reserve mechanics -- the cost of insurance, the interest credited, surrenders and expense loads. If you showed this to management, I guarantee they would love it.

Why would management be excited? How does this statement measure up to the ideal income statement?

1. Does it show you how much money we made? Certainly, any kind of an income statement is going to do that for you.
2. Does it show you where profits and losses came from? It certainly does. That is one quantum leap forward in presenting some financial information.
3. Can you determine if there are problem areas? I think so. If profits are not what they are supposed to be, you can look at the sources of profit to find the problem area. That leads us to the next issue.

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4. Can we fix the problem areas? I call this an "almost" category. If one of the margins is negative (and it is supposed to be positive), something should be done. For example, if the interest margin is negative, a simple fix is to decrease the credited interest rate. I put this in the "almost" category because we really need to look at both actual and expected profits by source before we can fix the problem.

For example, if the expected investment income is \$100 and the expected interest credited is \$90, the expected interest margin is \$10. If the actual investment income is \$95 and the actual interest credited is \$88, the actual margin is \$7. In this example, say the actual and expected reserves are identical. We now have two profitability problems. We are not earning the returns we expected (\$100 versus \$95). At the same time, we are crediting too much interest (a \$10 margin versus a \$7 margin). To fix the problem, we find out why the investment department did not perform as expected, as well as talk to the marketing department about keeping the credited interest rate at too high a level. This is obviously a simplistic example, but it should show that with an actual and expected sources of profit statement, information is available to fix problem areas.

5. Did we increase our value or worth? Not yet. That is still a step beyond a normal income statement. I'm a proponent of GAAP or value added concepts. A statutory income statement for a particular point in time still does not tell us if we did good today because the business we are in is long term. If we bring present values back at reasonable interest rates, that permits us to calculate the increase in our value or net worth.

What I have illustrated is a simple statutory case. I will now share possible refinements. The dividend can be broken into various three-factor components (interest, mortality, expense) and this should give us a very useable sources of profit statement. It is also interesting to separate out interest on capital and surplus and overhead expenses. Charge the product line just its expenses and credited interest on assets that back up the reserves. Looking at the profits without capital and surplus or interest on capital and surplus or overhead. It is a little scary what your actual product margins look like.

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For many companies, reinsurance is relevant to the bottomline. Isolate the elements that go into reinsurance; i.e., how much did we pay the reinsurers versus how much did we get back? If that is positive, then the reinsurer made good on the deal.

Finally, several companies look at financial results using the value added concept. Value added in a statutory environment is measuring the change in the present value of future profits. If that increases, we think we have done good, and if it decreases, we have done bad. If we can measure the present value of future profits, shouldn't we be able to measure the present value of future sources of profits? This is what I would consider a utopian financial statement.

To take a big leap forward, let's move to GAAP. We have been talking statutory to date, but I think this sources of profit analysis works better in a GAAP environment.

A typical GAAP income statement is identical to the statutory, ignoring some little differences, with the statutory increase in reserve removed and replaced with the increase in benefit reserve and increase in deferred acquisition cost (DAC). DAC here is a negative reserve. The same problem exists however -- too much financial information is contained in the reserve element.

What do we do? Break the GAAP reserve into its components. It is made up of the benefit premium plus GAAP interest credited on the benefit reserve, minus GAAP deaths, minus GAAP surrenders, minus benefit reserves released on deaths and surrenders. In this formula, GAAP interest on reserve, GAAP deaths and GAAP surrenders are based on the GAAP assumptions used in establishing the reserve. This is very similar to the statutory concept. You can obviously see where I am going here.

The increase in DAC (treated as a negative reserve) is made up of the amortization of the DAC, plus the GAAP interest credited to fund the reserve, minus deferrable expenses that are charged to this period, minus DAC released on death and surrender. So what do you do? You take this and put it back into the original formula, mix the terms up.

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If you trust me, you end up with a GAAP sources of profit statement. I like this better than the statutory statement. Profit is investment income minus GAAP interest. That is my interest margin. This is different than interest credited to the reserve. The GAAP interest is what we assumed, in our GAAP assumptions, we are earning on reserves.

FIGURE 3  
GAAP SOURCES OF PROFIT STATEMENT

$$\begin{aligned} \text{Profit} = & \text{Investment Income} - \text{GAAP Interest} \\ & \text{(Interest Margin)} \\ & + \text{GAAP Deaths} + \text{GAAP Reserves Released} - \text{Deaths} \\ & \text{(Mortality Margin)} \\ & + \text{GAAP Surrenders} + \text{Reserves Releases on Surrender} - \text{Surrenders} \\ & \text{(Withdrawal Margin)} \\ & + \text{Premiums} - \text{Benefit Premiums} - \text{Amortization of DAC} \\ & \quad - \text{Maintenance Expenses} \\ & \text{(Expense Margin)} \end{aligned}$$

If the product we are looking at is a traditional product using the percent-of-premium GAAP method, the interest, mortality and withdrawal margins in this statement would show the release of margins for adverse deviation. In a composite GAAP environment, where margins above and beyond your adverse deviation margins are added, a sources of profit statement shows the release of the margin.

The second item is the mortality margin: GAAP deaths plus GAAP reserves released minus deaths. Again, this is not cost of insurance deductions minus deaths. It is the mortality assumption that was assumed in developing the GAAP reserves minus the actual GAAP deaths. In a traditional GAAP environment, this is the release of the adverse deviation. In a composite GAAP environment, this is the release of that profit margin that is in the mortality assumption.

The third item is the GAAP surrenders plus GAAP reserves released minus surrenders. Again this is driven off of the GAAP withdrawal rates versus actual experience. More often than not, I have not seen imputed GAAP margins in withdrawal rates, so that in this sort of expected GAAP statement, the GAAP surrenders and the actual surrenders are the same. This allows you to look at a withdrawal study when you compare actual to expected.



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The last item is the premium collected. Premium is a relevant issue on a GAAP financial statement. Premiums collected minus benefit premiums (needed to fund the benefit reserve) less the amortization of the DAC, which is the DAC premium or expense premium (keeping in mind, it's a negative reserve), minus the maintenance expenses. Looking at the top three items in a traditional GAAP environment -- premiums minus benefit premium, minus amortization -- that is the profit margin on a GAAP basis. We then subtract any maintenance expenses that result from doing business. What we end up with is a GAAP sources of profit statement. Again, when you do this with an actual on one column and an expected on another column and compare, you have an immense amount of information that heretofore has never been seen. This is something management should be able to understand quite easily.

In summary, sources of profit provides much more information than a typical income statement. By definition, management means having the information, and therefore, the control to do something about what you are managing. The sources of profit give you a lot of information.

What we have done is an actual to expected sources of profit statement. Information is available to fix problems. You know what you need to do to a universal life, how much you can increase your cost of insurance rates to get your desired profit margin, how you need to move your credited rate to get your interest margins, and on and on.

A sources of profit analysis is ideal for management reports. Certainly, it is extremely useful for internal reports. It may also have some applications in an external financial reporting environment when used with care. That leads directly into what Charles is going to be talking about. Sources of profit analysis is also a great pricing tool, and that is what Jeff is going to talk about.

MR. CHARLES MCLEOD: Contrary to public belief, consultants do not know everything there is to know about every possible subject. Despite this, I am still amazed by people coming up to me and asking, "Do you know what company X is doing about subject Y?" and their being surprised when I don't know the answer.

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Today things are different. Greg gave me six months' notice, so I took the opportunity, with Carol Moellers, one of my colleagues, to do a survey of what companies are actually doing in the way of measuring profit by different sources. The first part of my remarks today will cover the results of the survey.

I surveyed 80 of the largest U.S. life companies, and I was extremely pleased with the response. As you can see in Table 1, over 3/4 of the companies we contacted replied. All of the companies have at least \$10 billion of insurance in force. Only U.S. companies were included. Canadian companies, even if they do business in the states, were not included. Companies that write primarily reinsurance business were excluded.

TABLE 1  
SUMMARY OF RESPONSES

Companies surveyed	<u>Stock</u>	<u>Mutual</u>
Responses	51	29
	40	22
Ratio	78%	76%

A prerequisite to analyzing profits by source is a definition of profits. In the survey and in the remarks I am going to be making, I consider only the profits reported in a company's internal financial reports. I define "internal financial reports" as the reports used by senior management (i.e., the CEO and vice-presidents) in measuring and monitoring the financial performance of the company.

As you can see in Table 2, the definition of profits for internal financial reports varies between stock and mutual companies. Some companies report on more than one basis and that's why the numbers may appear to be overstated. Stock companies are paying particularly heavy attention to GAAP results and mutual companies are paying more attention to statutory results.

I was still disappointed, however, to learn that only a minority of companies have developed some form of internal basis financial reports. Statutory accounting and GAAP accounting both have some weaknesses as an internal

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management tool. While it may be impossible to avoid preparing and monitoring statutory and GAAP results, I do not believe they always provide a good picture of how well the company is really doing.

TABLE 2  
DEFINITION OF PROFITS FOR  
INTERNAL FINANCIAL REPORTS

	<u>Stock</u>	<u>Mutual</u>
Statutory	11	15
GAAP	34	2
Internal basis	6	11
Companies responding	40	22

(Note: Some companies report on more than one basis.)

There are 17 companies which have developed some form of internal basis financial reports, and the major difference between the internal reports and the statutory reports are displayed in Table 3.

TABLE 3  
INTERNAL BASIS FINANCIAL REPORTS  
DIFFERENCES FROM STATUTORY BASIS

	<u>No. of Companies</u>
Definition of investment income	11
Valuation assumptions	7
Valuation methods (e.g., amortization of acquisition expenses)	12
Amortization of development expenses	5
Treatment of income taxes	7
Other	4

(out of 17 companies with internal basis financial reports)

A major difference, as you can see in Table 3, is a different definition of investment income. I did not ask specific details on this, but I think this would generally relate the treatment of realized and unrealized capital gains and losses.

Some companies may use different valuation assumptions or valuation methods. Again, I am assuming to eliminate the reserve strain on new business. The same

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thing goes with amortization of development expenses. This is a case where you may be getting into the property and casualty business, and you may spend \$5 million or more before you get into the business. I think it is inappropriate to charge that against an existing product line. You may want to hold it until you get into the property and casualty business, and then bring it in in increments over a few years. Income taxes may be treated differently as well by a number of companies.

Table 4 covers the frequency of reporting for mutual companies. As you can see, quarterly reporting is the norm for mutual companies. It really doesn't matter here what type of financial reporting companies are actually doing.

TABLE 4  
FREQUENCY OF REPORTING  
Mutual Companies

	Statutory	GAAP	Internal Basis
Monthly	4	0	2
Quarterly	14	2	7
Semi-Annual	1	0	0
Annual	<u>3</u>	<u>0</u>	<u>2</u>
	22	2	11

Table 5 covers frequency of reporting for stock companies. Again, quarterly reporting is more common, but you can see a larger percent of your companies do monthly reporting for their internal reports. It does not appear on the table, but by looking at the individual responses, I could see that in general the larger the company, the more likely it was to be reporting earnings on a monthly basis as opposed to a quarterly basis.

TABLE 5  
FREQUENCY OF REPORTING  
Stock Companies

	Statutory	GAAP	Internal Basis
Monthly	14	14	3
Quarterly	26	20	2
Semi-Annual	0	0	1
Annual	<u>0</u>	<u>0</u>	<u>0</u>
	40	34	6

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The next set of questions in the survey covered the number of product line classifications in a company's internal financial reports. You can see quite a wide range of practices in Table 6. One company has only one product line classification. The record was set by a company with 50 product lines. Only eight of the 62 companies who replied used the same definition as appears on page 5 of the NAIC statement.

TABLE 6  
NUMBER OF PRODUCT LINE CLASSIFICATIONS  
IN INTERNAL FINANCIAL REPORTS

	<u>Stock</u>	<u>Mutual</u>
5 or less	13	10
6 to 10	12	7
11 to 15	6	4
16 to 20	5	1
Over 20	<u>4</u>	<u>0</u>
	40	22

Table 7 summarizes the companies' practices in the allocation of surplus. There was not much uniformity of practice here. Some companies allocate all surplus to the product lines, some companies keep all surplus in a corporate line and some companies use a combination. The only uniformity is with a few mutual companies that keep surplus as a separate product line.

TABLE 7  
TREATMENT OF SURPLUS

	<u>Stock</u>	<u>Mutual</u>
Allocate all surplus to product lines	10	9
Maintain surplus as separate produce line	16	2
Combination	14	9
No reply	<u>0</u>	<u>2</u>
	40	22

My own preference is not to allocate surplus to product lines. I think you get a better picture of how the product lines are really doing. It can be inappropriate to credit today's product line management with the investment income on surplus which is earned by an earlier management. If surplus is allocated, either in whole or in part to a product line, I think it is important to isolate, for each product line, the amount of investment income or profits for that line which represent interest on surplus.

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Table 8 compares asset segmentation. I was surprised at the number of companies that do not have asset segmentation (and it is not just the smaller companies). A lot of the larger companies have not segmented their assets. The stock companies that have introduced it tend to have a fairly small number of funds. Mutual companies, by and large, have introduced asset segmentation and tend to have a much larger number of funds than stock companies. The award for the highest number of funds, which was 29, was won by a stock company.

TABLE 8  
ASSET SEGMENTATION

<u>Number of Funds</u>	<u>Stock</u>	<u>Mutual</u>
Less than 5	18	7
6 to 10	4	5
11 to 15	2	2
Over 15	1	1
No asset segmentation	<u>15</u>	<u>7</u>
	40	22

My personal preference, at least initially, if you are developing asset segmentation, is to keep the number of funds low; i.e., about four to six. You need to distinguish between product lines which have significantly different guarantees and liability cash flow patterns. If you have too many funds, you get confused in the details and you may overlook some of the broader issues.

I think there can also be a risk of suboptimization if you have too many funds. From one point of view, the product line managers may take a short term focus, with the result that no one wants to invest in equities, even though in the long run that might be the right thing for the company. Second, a combined investment policy for two distinct product lines may result in more competitive rates and less risk. An example of this would be to combine a product line, whose mean term or duration is so long that a reinvestment is necessary, with a product which has short term liabilities. The mean term or duration of the combined products may be short enough that no reinvestment assumption is necessary.

I'll turn now to the analyses of sources of profit and loss. The major sources of profit and loss are:

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1. Assumed expenses less actual expenses
2. Actual investment income less assumed (required) investment income
3. Assumed claims (mortality and morbidity) less actual claims
4. Gain or loss from surrender
5. Gain or loss from additional benefits (riders)
6. Assumed taxes less actual taxes
7. Net cost of reinsurance
8. Reserve strain (release)

In this context, "assumed" means what is assumed in the pricing basis and may not necessarily be the same as in your reserving process. Most of the sources of profit and the reasons you would want to know the amount of profit or loss from each source, are self-evident, but I think a few comments are in order.

Gain or loss from additional benefits can be a lot more significant than you might expect. I have come across one company whose accidental death benefit rates are the same level as its yearly renewable term rates. If you are a mutual company, you may be getting very large profits from nonforfeiture benefits, such as extended term, or from your dividend options, i.e., paid-up additions, dividends left on deposit. I also think companies should know how much reinsurance is costing them -- or the extent to which a reinsurer's past generosity has contributed to their improved earnings.

Unfortunately, very few companies actually determine the sources of profit or loss for their major product lines. This is demonstrated in Table 9.

TABLE 9  
EXTENT OF PROFIT AND LOSS ANALYSIS  
(at product line level)

	<u>Stock</u>	<u>Mutual</u>
Expenses	22	14
Investment	22	14
Claims	23	14
Lapse/surrender	15	9
Additional benefits	4	9
Taxes	6	3
Reinsurance	15	6
Reserve strain	6	6
Companies responding	<u>40</u>	<u>22</u>

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Table 9 shows, for the previous eight elements, separately for stock and mutual companies, how many companies actually calculate the gain or loss from their major sources. As you can see, even for what I consider the three major sources of profit and loss -- investments, expenses and claims -- just over half of the companies surveyed actually determine gains and losses from those sources. For other elements of gains and losses the ratios are even lower. Some of this is understandable. If you do not sell much in the way of additional benefits, there is not much need to calculate gains from that source. If you are not paying income taxes and you do not expect to pay taxes for a number of years, there is not much justification in calculating the gain or loss from taxes. On the other hand, Table 5 showed that there were 14 stock companies who are using statutory earnings as their primary measure of profits. Of those 14 companies, only four of them actually calculate the reserve strain or the reserve released on new business and on surrenders.

A related question asked those companies who do calculate gains or losses from most sources whether or not they attempt to reconcile the sum of gains from the individual sources to total earnings. Less than a third of all the companies surveyed make this calculation and reconciliation at the total company level, although the proportion does rise to about half at the product line level.

Table 10 is a question I threw in partly for my own interest. I was asking whether companies internally reinsure part of the risk for a particular product line, perhaps because the retention limit for the total company is too high for a single product line.

TABLE 10  
INTERNAL REINSURANCE

Do you internally reinsure part of the risk for a particular product line?

	<u>Stock</u>	<u>Mutual</u>
Yes	5	6
No	35	15
No reply	<u>0</u>	<u>1</u>
	40	22

As you can see, very few companies actually do practice some form of internal reinsurance. Although it may be a chore to set up the accounting procedures,



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if you have this in place, you remove the distortion that occurs when a small and/or new product line is charged with a large claim, part of which would have been reinsured if the product line had been an independent business unit.

The final question in the survey asked whether companies calculated, at least once a year, the present value of profits on inforce business. This is the value of the value added concept that Greg mentioned.

As you can see in Table 11, very few companies, especially mutual companies, do this. Of the mutual companies, only one company does it for all product lines out of 22 companies; for stock it's five out of 40. I think this is disappointing. I think it is going to change because companies who do this are finding out the work is substantial in getting the process in place, but if you can do an analysis of the change in value of the company from year to year, and break down how that change in value results from change in mortality, the sources of profit and loss, this can be an extremely powerful management tool in letting management know how well the company is doing and why. Having described what companies are, or are not doing, I will now describe two reports that I think all companies should be producing.

TABLE 11  
VALUE OF INFORCE BUSINESS

Do you regularly calculate the present value of future profits for inforce business?

	<u>Stock</u>	<u>Mutual</u>
All product lines	5	1
Some products only	5	1
No	30	17
No reply	<u>0</u>	<u>3</u>
	40	22

This statement (see Table 12) analyzes total company profits by source and by major product line or business unit. I did not put all the numbers on, but the bottom left-hand number total profits is \$300; this is the company's total profits, all product lines combined. In practice, what you try to do is break

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that \$300 down by business unit or product line on the horizontal axis (I just have three products and a corporate surplus line in this example; in practice, there would be more product lines). You also analyze the \$300 by source of profit on the vertical axis.

TABLE 12  
ANALYSIS OF EARNINGS

	Total	Business Unit		
		Ordinary Insurance	Ordinary Annuity	Group Corporate Surplus
Expenses - Sales	\$ 20		-	
Expenses - Admin.	10		\$10	
Investment	250		40	
Mortality	( 30)		-	
Lapse	-		-	
Planned Profit	70		-	
Reserve Strain	( 20)		-	
Other	<u>-</u>		<u>-</u>	
Total Profits	\$300		\$50	

I would envision the chief executive officer receiving this one-page report summarizing profits, and the major sources of profits for the major product lines or business units in the company. Each division head would receive a similar, one-page report for his division or business unit, except that only the product lines in his division would be included and probably those would be broken in finer detail than the report to the CEO.

Today most companies are not able to produce this type of report. I say this based on the results of the survey. I think this is the type of summary which all companies should be attempting to produce. My recommendation would be to fill in as many of the blanks as possible; even if you cannot fill in the whole thing, you can put in some numbers now and then and work over a two-year period toward filling in all the blanks.

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A second, one-page summary that should also be received by the CEO focuses on "indicators" rather than profits. The headings on the horizontal axis on this summary are the ordinary insurance, ordinary annuity and group -- the business units of the company. The indicators down the left-hand side are those the company considers important -- things like a measure of sales, market share, lapse rates, mortality ratio, interest spread and expense ratio. As with Table 12, each division head would receive a similar one-page summary covering the major product lines in his division or business unit.

In all cases it is important to compare actual results against a standard, and highlight the adverse deviations. When results are bad, management may want to review more detailed back-up reports, but they will not want to do this for every indicator for every business unit.

I think it is very important to summarize the volume of data from your gain and loss analysis, sources of profit and loss, into these two, one-page reports, for two reasons: (a) If you have only two pages, it forces you to display only the important numbers, and (b) the reports are much more likely to be read, and more importantly, lead to action.

To conclude, I would like to make a few general remarks about the presentation of the results of your profit and loss analysis. Some of them may seem obvious, but I will defend myself by saying that I have seen too many examples of them not being followed.

Do not try to show too much information. The two reports I just described take only two pages. Despite their brevity, they should provide the CEO with most of the financial information he needs to manage the company. I think very few CEOs have the type of reports I have described. If you do, you have more information than maybe 95% of the other CEOs in the life insurance business.

Involve the eventual users in the design of the reports. Help them to understand the meanings, use and implications of the reports. If people don't understand the reports, they won't use them, and if results are bad, they will do their best to discredit the reports.

## PANEL DISCUSSION

And finally, remember why you are doing all this. You are not trying to win a prize for the best actuarial paper ever published. You are trying to identify to management where problems may exist and the source of those problems.

MR. JEFFREY C. HARPER: Greg has described some of the reasons for and some of the interest in analyzing profits by source and he has even given us some targets as to what our reports ought to look like eventually. Charles has described what some of the management information systems that currently exist look like.

My task is to illustrate the sources of profit and how they can enter the pricing process. I am going to try to do a monitoring process by looking at some actual to expected numbers. Since my cohorts have concentrated on all the cosmic and theoretical background, I am going to spend my time looking at numbers. What I am going to try to do in my presentation is go through a series of examples, again from a pricing actuary's viewpoint. The tracks will be something as follows: (1) define a standard product, a set of standard profit test assumptions, and some standard profit test analyses; (2) define what sources of profit are buried -- similar to what Greg did earlier for financial statements; (3) look at a couple of alternate product designs that from an insured's viewpoint would be just about the same product, but not so from the company's viewpoint; (4) follow these sources of profit as experience unfolds; i.e., monitor experience.

In this exercise, a couple of the points in the program will actually be alluded to, which is unusual for most panel discussions. I am going to address most of the elements of profit in the list, either directly as a defined source of profit or indirectly as an outside force on profit, and address profit analysis and tracking as a business tool. Many of the example projections illustrate profits by source, which could be used to drive management action.

Hopefully, in this exercise you will see that you don't always get what you want, you don't always see what you get, and, you don't always know what you see.

## SOURCES OF PROFIT ANALYSIS

First, in spite of crisp, clean formulas in actuarial literature, the definition of sources of profit itself is not a simple or single-answered question. We could be talking about statutory or GAAP or some other type of profit -- both gentlemen have referred to that. A policy deduction could be defined as a load, a contingency charge, a profit charge, or any number of things. We have to worry for our investment income what type of assets we are talking about -- reserves, cash values, asset shares. We also have to define line of business and all kinds of cosmic things.

In general, most people think that sources of profit should be balanced. A balanced source of profit is a good thing. This would imply that each of the sources the company chooses to define be approximately equal. I do not think that always is the case. Sometimes you are going to want to distort your profits. While I am not supposed to be talking about GAAP accounting for interest-sensitive products in this presentation, GAAP is one example where manipulating (or perhaps managing would be a better word) sources of profits has implications outside the pure pricing process.

Let's consider our standard cell to be a universal life product that you can find anywhere. It is a male issue age 35. The premium is \$8.50 and it is a target premium plan, just so we have commission rates that are in a percent. The product loads are 5% of premium all years and \$24 per policy, and the surrender charges are 140% in the first year which grade linearly to 0 at year 15.

The cost of insurance charges are fairly high compared to what a lot of companies charge. The reason for that is for illustrative purposes to make the graphs that appear later look neater. The mortality is not unreasonable; it is \$2.30 at age 35 and gets as high as \$12 at age 55.

The currently credited interest rate is 9%, and if we looked at the Tillinghast Universal Life Analytic Study survey, that is probably not untypical for what is currently being credited. Again, the product is designed to be a vanilla product that could be found anywhere in the market, but this one may be a little bit skewed towards mortality profits.

## PANEL DISCUSSION

Profit test assumptions are also supposed to be generic. It is a \$50,000 policy, issue age 35, male. Lapse rates are 22% in the first year grading out to 5% in the ultimate years. The mortality is 70% of the 1965-1970 table. That is meant to supply some type of positive mortality margin. It is not supposed to be a fancy mortality assumption. The agents' compensation is 95% of premium in the first year and 7% in renewal years. That may sound high but it depends on how many general agents' layers you have.

On the surface, you are going to expect some type of mortality profits. You do not know about interest profits yet because you do not know how much you have invested or what your real assets are.

You are probably going to expect a loss from loads. For example, the total load is about \$.90 per unit or 11% of premium in all years. The expenses are \$11.80 or 140% of first year premium, and about 14% of renewal premiums. Again, inflation is in here at 3% per year. These expense rates are meant to be typical of a \$50,000 policy size, \$70 per policy, \$.90 per unit, 10% of premium. The maintenance cost for the first round is set at \$20.00 per policy. I would like to say it was good planning that the surrender charges are equal to 140% of the premium load, but it was blind luck (and probably irrelevant anyway). To summarize again on the loads, we would expect to lose 3% to 4% of premium, so when we get negative numbers we won't be alarmed.

The interest credit is 10.5%, a 150 basis point margin. That is typical of what companies are getting in theory, but I have severe doubts about what they are actually getting. Reserves are set equal to Commissioners Reserve Valuation Method (CRVM) reserves. The pricing horizon is 20 years. Federal income taxes are 35%. So what are the results of the initial analysis?

Table 13 is an annual statement on a projection basis. This is for one unit, which was \$8.50 premium. You can see how the premium income reduces each year as the policy is lapsed. There is a negative investment gain in this particular output because the first year cash flows are negative and you only have CRVM reserves being invested. The benefits are low in the first year and bounce up in renewal years, and again this is primarily due to CRVM reserves. (I warned you that we would come out with reserves being important when we were

## SOURCES OF PROFIT ANALYSIS

done.) The commission and expense costs are \$10.60. I promised you \$11.80, but some people lapsed during the first year. There is a negative federal income tax in the first year, and you end up with an after tax loss of about \$2.60 the first year. This is offset by gains in the \$.50 to \$.80 range in all renewal years. The overall profit margin, which is not illustrated here, is approximately 12% before tax and 8% after tax.

TABLE 13

ANNUAL STATEMENT

Standard Product Specifications  
Standard Profit Test Assumptions

Policy Year	Income		Benefits	Commission Expense	FIT	Profit After FIT
	Premium	Investment				
1	\$7.43	\$(-.32)	\$ .50	\$10.60	\$(1.39)	\$(2.60)
2	6.08	.28	4.29	.84	.43	.80
5	4.30	1.16	3.80	.62	.37	.67
10	3.26	2.38	4.38	.49	.27	.50
15	2.49	3.45	4.62	.40	.32	.60
20	1.87	4.00	4.27	.32	.45	.83

Most actuaries are comfortable with this type of approach, and there are probably as many nonactuaries that are equally comfortable. Now we get to the hard part which is our second topic: defining the sources of profit .

We have defined, somewhat arbitrarily, six sources of profit (counting federal income tax). The sources of profits most people are used to seeing are mortality gain, excess interest gain, and loading gain (or loss). You can see all three of these show up in our breakdown here. The next one we included was surrender charges. A lot of people would tend to lump surrender charges in with the loads, but we have got some lapse sensitivity tests and you get better answers if you separate those surrender charges out. Also, I have separated the reserve increase out here primarily to illustrate the effect of CRVM reserves versus the loads.

## PANEL DISCUSSION

The actual impact of the reserves on a present value basis ideally, if you look at the bottom line, would be zero. With the miracles of modern electronics, we have managed to make reserves make a penny's worth of difference here.

Alright, so what is significant about this? First of all, recall that both profit test assumptions and the product specifications are meant to be pretty standard for the industry. In the bottom of the left-hand column in Table 14 you see the mortality gain is about \$9.00. This is about 3 or 4 times the total profit (in the bottom right-hand column -- \$2.63). Of the many products we have seen, this really is not an unusual number.

TABLE 14  
SOURCES OF PROFIT

Standard Product Specifications  
Standard Profit Test Assumptions

Policy Year	Sources of Profit					Federal Income Tax	Total Profit
	Mortality	Interest	Loads	Surrender Charges	Reserves		
1	\$1.63	\$ .04	\$(10.69)	\$ .70	\$4.33	\$(1.39)	\$(2.60)
2	1.36	.09	(.19)	1.08	(1.10)	.43	.80
5	1.02	.20	(.12)	.43	(.48)	.37	.68
10	.98	.37	(.13)	.12	(.57)	.27	.50
15	.95	.49	(.13)	0	(.39)	.32	.60
20	.83	.57	(.12)	0	0	.45	.83
PV	9.14	2.17	(10.65)	3.38	.01	1.42	2.63

The interest profits are about \$2.00, just slightly under 100% of the total profit. If you combine loads and surrender charges you lose about \$7. Reserves have no impact on a present value basis: they just shift your profits forward a bit.

Our third topic is to come up with a couple of alternative products which are comparable from an insured's point of view. For the first alternative we are



## SOURCES OF PROFIT ANALYSIS

going to assume that we reduced our high cost of insurance (COI) charges and we increased our loads to make up the difference. We have cleverly called this scenario low COI/high load. Why would a company want to come up with such a design? Remember our audiences -- marketing people and management people. From a marketing viewpoint it is possible that the agents have started comparing COI rates. Perhaps the agents' insureds have started looking at term rates or perhaps nobody believes advertised interest rates anymore, so they ignore the interest credits. From a management viewpoint, the reasons they might want this type of product design would be they have seen that mortality profits are very high, loads profits are very low and they want to balance them a bit. What we did to accomplish this ultimate design was to move \$1.20 each from the COI over to the loads.

The second design we looked at was a case where the excess interest credits have been reduced substantially in exchange for the reduction of COI. We kept our loads at fairly low levels. Why would a company ever want to do something like that? From an agent's viewpoint, perhaps they want earlier cash values for their insureds. They are less concerned about values after the 20th year and they want high cash values in the first five years. From a management viewpoint, perhaps again they just want more balanced profits. They may feel that they are no longer competing with long bonds and are now competing with passbook savings which currently are 5% or 6%. Perhaps Jim Anderson's famous game of chicken is finally over and everyone has lowered their interest rates.

The way we accomplished this product design was to take the same \$1.20 out of the COI rates and reduce the interest credits. It so happens that 6.75% interest gave us the answer we wanted, that is a reduction of just over 2 points.

It is impossible to get the plans equivalent all up and down from the insured's viewpoint, so we have decided to zero in on the 20th year cash value. For the first two plans in Table 15, our standard plan and the one with the low COI and the increased loads, the values are very similar in all durations. We had to go to dollars and cents to get a difference. For the low COI plan, you have higher cash values earlier on which you will recall was the reason the agent wanted it in the first place. You can see his cash value increases are going

## PANEL DISCUSSION

to be lower after the 20th year. This will tend to reduce profits over a 20-year horizon and increase profits over a longer horizon as you end up with larger funds earning the interest spread. So what does the annual statement look like under our ultimate designs?

### TABLE 15

#### CASH SURRENDER VALUES PER UNIT

<u>Policy Year</u>	<u>Standard Product Specifications</u>	<u>Low COIs/ High Loads</u>	<u>Low COIs/ Low Interest</u>
1	\$0	\$0	\$0
2	0	0	1.81
5	19.14	19.01	24.41
10	65.57	64.96	73.62
15	122.49	120.76	128.58
20	185.72	181.78	181.66

With the low COI/high load, we have an annual statement that looks almost exactly like our original plan. (See Table 16.) Changing the product specification from a cost of insurance deduction to a load had absolutely no impact on the normal pricing procedure. I think the total present value was \$2.63. Now in the bottom right-hand corner you can see it is \$2.75. Also, if you look at it year by year, the cash flows, reserve increases, and so on, are all very similar.

Has changing the product design changed the profitability? No. Has it changed the sources of profit? We are going to see that it has made some rather remarkable changes to the sources of profit.

## SOURCES OF PROFIT ANALYSIS

### TABLE 16

ANNUAL STATEMENT  
Low COI/High Loads  
Standard Profit Test Assumptions

Policy Year	Income		Benefits	Commission Expense	Tax	Profit After Tax
	Premium	Investment				
1	\$7.43	\$(.32)	\$ .50	\$10.60	\$(1.39)	\$(2.60)
2	6.08	.28	4.28	.84	.43	.81
5	4.30	1.16	3.78	.62	.37	.69
10	3.26	2.36	4.31	.49	.29	.53
15	2.49	3.40	4.54	.40	.33	.62
20	1.87	3.92	4.15	.32	.46	.86
PV						2.75

When we reduce the interest crediting rate for our second alternative plan (see Table 17) we do have some impact on profits, but you probably could find a pricing horizon over which the present value of profits would be equal (25 to 30 years). Investment income is higher in the earlier years because you have a larger fund invested, and the benefits are higher through the middle years.

### TABLE 17

ANNUAL STATEMENT  
Low COI/Low Interest  
Standard Profit Test Assumptions

Policy Year	Income		Benefits	Commission Expense	Tax	Profit After Tax
	Premium	Investment				
1	\$7.43	\$(.32)	\$ .50	\$10.60	\$(1.39)	\$(2.60)
2	6.08	.28	5.08	.84	.15	.29
5	4.30	1.33	4.32	.62	.24	.45
10	3.26	2.66	4.76	.49	.24	.43
15	2.49	3.66	4.35	.40	.49	.91
20	1.87	3.97	3.63	.32	.66	1.23
PV						2.04

## PANEL DISCUSSION

To pull together all three of the different product designs we have, Table 18 summarizes the book profits year by year. Again, you can see the low interest product has lower profits in earlier years because you are paying out more benefits and the profits are decreasing faster. Total profits over the "standard" plan and low COI/low load plan are almost identical.

TABLE 18

STANDARD PROFIT TEST ASSUMPTIONS

Book Profits by Year

<u>Policy Year</u>	<u>Standard Product Specifications</u>	<u>Low COI/ High Loads</u>	<u>Low COI/ Low Interest</u>
1	<2.60>	<2.60>	<2.60>
2	.80	.81	.29
5	.67	.69	.45
10	.50	.53	.43
15	.60	.62	.91
20	.83	.86	1.23

Now I'll reconstruct our sources of profit analyses for these alternate products, using our previously defined sources of profit.

TABLE 19

ANNUAL STATEMENT

Low COI/High Loads  
Standard Profit Test Assumptions

<u>Policy Year</u>	<u>Sources of Profit</u>					<u>Federal Income Tax</u>	<u>Total Profit</u>
	<u>Mortality</u>	<u>Interest</u>	<u>Loads</u>	<u>Surrender Charge</u>	<u>Reserves</u>		
1	\$ .50	\$ .04	\$ (9.56)	\$ .70	\$ 4.33	\$ (1.39)	\$ (2.60)
2	.46	.09	.71	1.08	(1.10)	.43	.81
5	.40	.20	.52	.43	(.49)	.37	.69
10	.53	.37	.36	.12	(.54)	.29	.54
15	.62	.48	.25	0	(.40)	.33	.62
20	.61	.55	.16	0	0	.46	.86
PV	4.07	2.15	(5.36)	3.38	(.01)	1.49	2.75

## SOURCES OF PROFIT ANALYSIS

You clearly see (in Table 19) that the mortality load has been substantially reduced. We did have about \$9 as a present value of our mortality gain that is now about \$4 -- that's more than half. Our loss from loads is cut from something that was in the range of \$10 down to something in the range of \$5. Excess interest earnings, surrender charges and reserve increases, as well as total profits, are unchanged.

Table 20 shows sources of profit, again with the same definitions, with the low credited interest alternative. In this case, the mortality gain is still about \$4. The gain from surrender charges is a little bit higher all of a sudden because now we have an actual fund against which to assess surrender charges. The gain from excess interest has gotten quite a bit higher, about \$1.25 or a 60% increase.

TABLE 20

SOURCES OF PROFIT  
Low COI/Low Interest  
Standard Profit Test Assumptions

Policy Year	Sources of Profit					Federal Income Tax	Total Profit
	Mortality	Interest	Loads	Surrender Charge	Reserves		
1	\$ .50	\$.07	\$(10.66)	\$.85	\$5.25	\$(1.39)	\$(2.60)
2	.45	.15	.02	1.18	(1.37)	.15	.29
5	.40	.33	.14	.43	(.60)	.24	.46
10	.53	.59	.33	.12	(.89)	.24	.43
15	.61	.74	.45	0	(.40)	.49	.91
20	.61	.79	.50	0	0	.66	1.24
PV	4.05	3.42	(7.94)	3.62	0	1.10	2.04

Table 21 summarizes the sources of profit on the three designs. In all cases the total is between \$2 and \$3. We could probably take the horizon in which they would all be the same number. Mortality profits are obviously highest on our standard cell, and lower on both of the other cells. The gain from loads,

PANEL DISCUSSION

net of reserves, is worst with the first plan and best with the second plan (\$11 to \$5). The interest and surrender charge gains are the same for the first two products and jump up quite a bit when you have a larger spread.

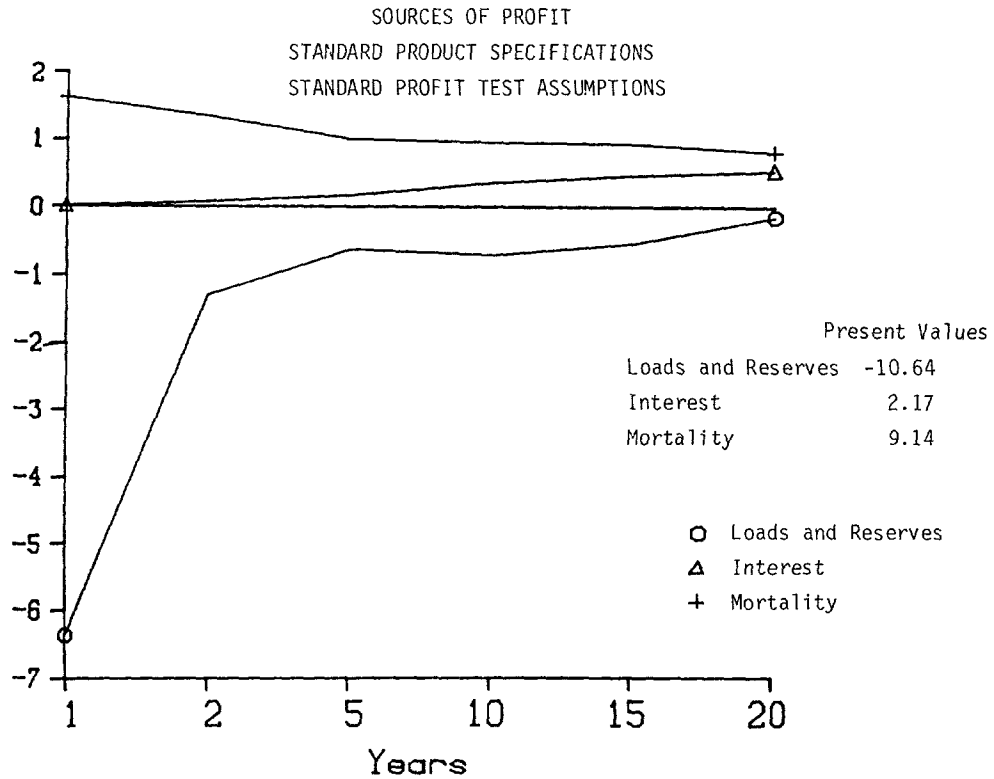
TABLE 21

PRESENT VALUES OF BOOK PROFITS

<u>Standard Product Specifications</u>	<u>Low COI/ High Loads</u>	<u>Low COI/ Low Interest</u>
2.63	<u>Total</u> 2.75	2.04
9.14	<u>Mortality</u> 4.07	4.05
<10.64>	<u>Loads &amp; Reserves</u> <5.36>	<7.94>
2.17	<u>Interest</u> 2.15	3.42
1.96	<u>Surrender Charge &amp; FIT</u> 1.89	2.52

Rather than digest the numbers in Graph 1, let's look at them from the viewpoint of the pricing actuary at the time of issue. This is our standard plan with standard profit test assumptions and the three sources of profit. We combined the reserve increases with the loads to make the scale easier to read. We have a mortality gain every year which decreases as the fund value increases and as people lapse. We have an interest gain which is very small in the first few years and starts to take off as the reserves increase in the third to fourth year. On the loads, we lose in the first year and actually never turn positive. Overall, each source of profit is not untypical for products we have seen developed where companies have analyzed the sources of profits.

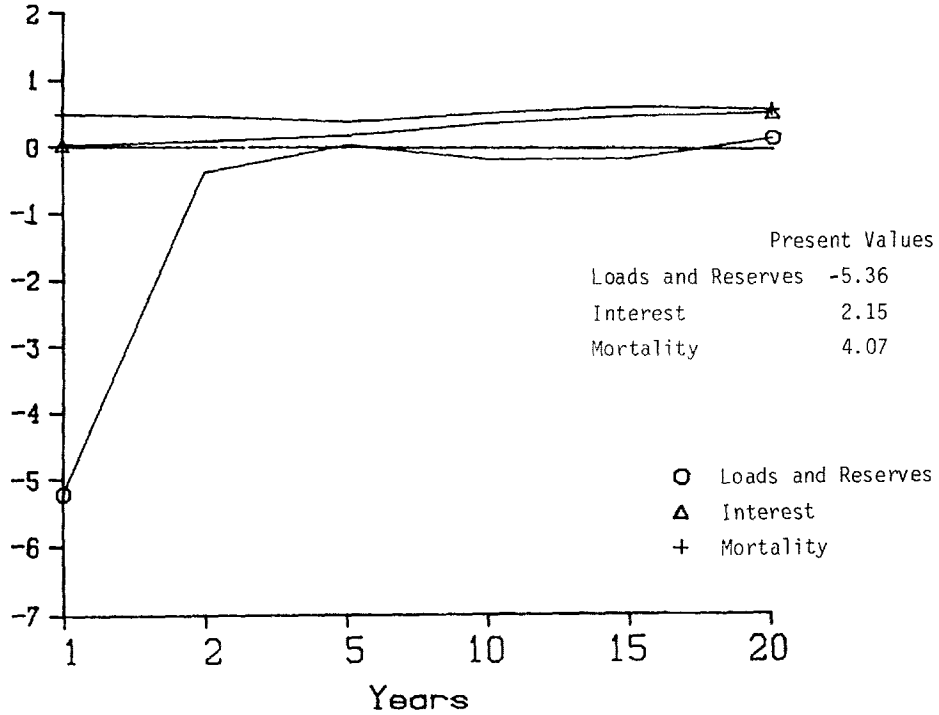
Graph 2 shows the very same product from the insured's point of view, but we have moved our deductions towards loads. We still have a mortality gain, our interest gain is relatively unaffected and all of a sudden we are breaking even on loads. This may make us think that perhaps we are not doing all that bad, so we will all get a salary increase and perhaps some new carpet in the office.



GRAPH 1

SOURCES OF PROFIT ANALYSIS

SOURCES OF PROFIT  
LOW COI/HIGH LOADS  
STANDARD PROFIT TEST ASSUMPTIONS



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PANEL DISCUSSION  
GRAPH 2



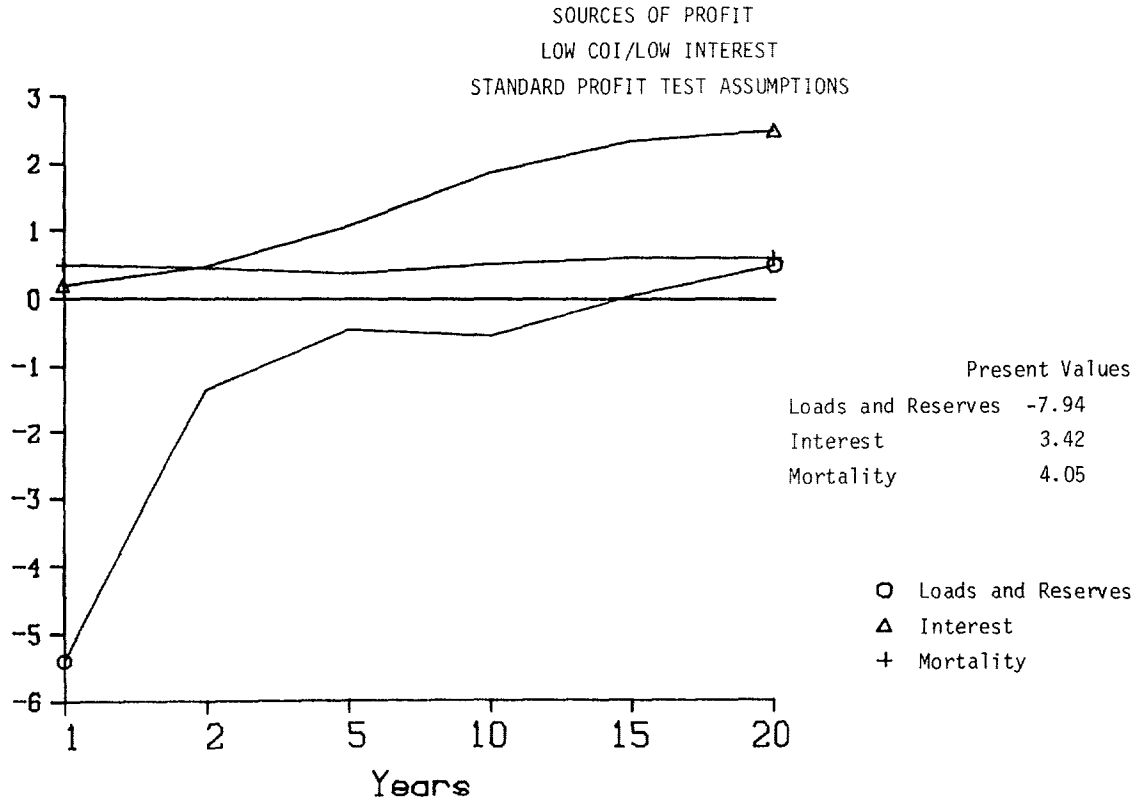
## SOURCES OF PROFIT ANALYSIS

Graph 3 shows the third product design where all the profits are coming through excess interest. There is still a slight mortality gain, but the excess interest gain is starting to take off and our loads have gotten to a breakeven year by 15.

Well, so much for alternate products. It is clear that we get varying sources of profit for the same product -- "you don't always know what you see." Let's address our last point and see what happens after the product is priced and experience starts to unfold. We are going to look at four scenarios: adverse mortality, adverse lapse, adverse expense and adverse interest earned.

Remember we have already priced the product, set our loads and defined our sources of profit. We are going to try to manage the product after it has been issued. What we are going to look for in our profit test cell is for the sources of profits to be maintained at the level we thought they should be maintained when we priced the product. Unless we are scientific enough, we are probably going to worry about signs more often than actual numbers. For that matter, we may look at trends. Keep in mind that in the real world things are much more complicated than in our cell. We are looking at age 35 male \$50,000 policy whereas in the real world you are looking at such inconveniences as mixed ages and mixed sexes, flexible premiums and benefits, multiple products, sometimes mixed front and back loads and normal random variation.

In Table 22, we have hit our standard assumptions with some adverse mortality. In fact, we have doubled the mortality, so many here would review that as an extreme case or on a block of business issued to a very high risk group. However, you could probably talk to some of the reinsurers and find that 200% mortality is probably not out in left field. You can see that the profits from mortality only remain positive for a few years, but they do remain positive. Total profits are down, and in fact they start to turn negative, but not for a number of years. Losses from loads are relatively unaffected, as are surrender charges and reserve gains. The only real impact in those areas is that you have fewer people surviving in force. A significant point from Table 22 is that mortality has been doubled, for all years, but the profitability has stayed positive, and each of the sources does not change, for up to 10 years. It is quite possible nothing would happen.



GRAPH 3

PANEL DISCUSSION

## SOURCES OF PROFIT ANALYSIS

### TABLE 22

#### SOURCES OF PROFIT

##### Standard Product Specifications Adverse Mortality

Policy Year	Sources of Profit					Federal Income Tax	Total Profit
	Mortality	Interest	Loads	Surrender Charge	Reserves		
1	\$1.11	\$.04	\$(10.69)	\$.70	\$4.33	\$(1.58)	\$(2.93)
2	.83	.09	(.21)	1.08	(1.10)	.24	.45
5	.42	.20	(.14)	.43	(.48)	.15	.28
10	.16	.37	(.13)	.12	(.56)	(.02)	(.03)
15	(.14)	.48	(.13)	0	(.39)	(.06)	(.12)
20	(.41)	.54	(.13)	0	0	0	0

In Table 23 we have looked at the low COI/high load product which you will recall from the insured's viewpoint is basically the same product. You can see that mortality gains have turned negative immediately. Beginning in the second year we are losing money from the mortality source. Loads are relatively unalarming to the typical management team, and in fact they do remain positive beginning in the second year, which is probably gratifying to the folks that are worrying about the excess mortality.

### TABLE 23

#### SOURCES OF PROFIT

##### Low COI/High Loads Adverse Mortality

Policy Year	Sources of Profit					Federal Income Tax	Total Profit
	Mortality	Interest	Loads	Surrender Charge	Reserves		
1	\$0	\$.04	\$(9.58)	\$.70	\$4.33	\$(1.58)	\$(2.93)
2	(.06)	.09	.70	1.08	(1.10)	.25	.46
5	(.19)	.20	.50	.43	(.49)	.16	.29
10	(.27)	.36	.33	.12	(.54)	0	0
15	(.45)	.47	.22	0	(.38)	(.05)	(.09)
20	(.63)	.53	.14	0	0	.01	.02
PV	(1.84)	2.11	(5.50)	3.38	0	(.64)	(1.21)

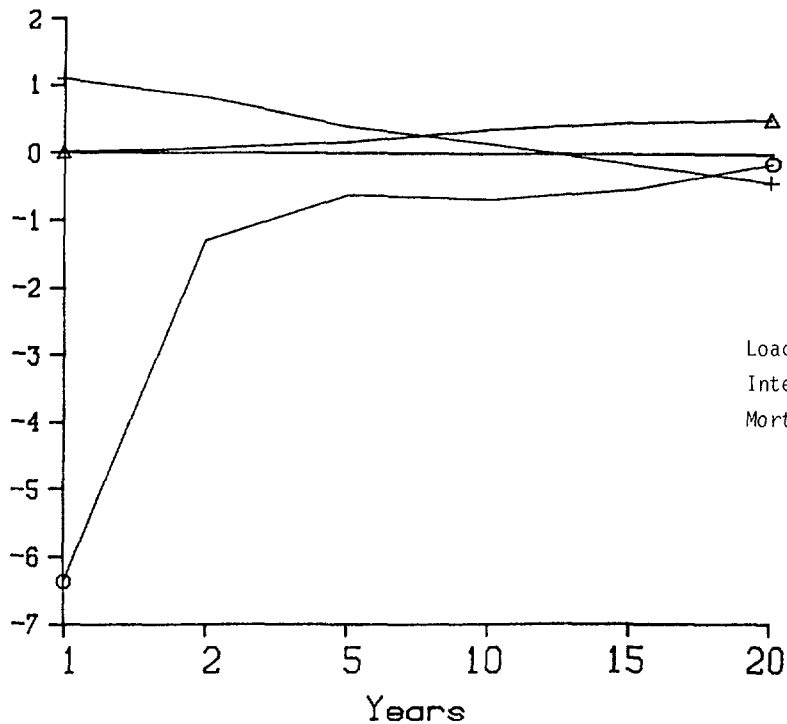
## PANEL DISCUSSION

You can see on Graph 4 that you have a lot of mortality load represented by the + line. You don't really have any mortality losses until well into the projection, around the 10th year. If you are trying to monitor the product, when you are looking at actual to expected, you are likely to say, even as late as 5 years, or maybe even 10 years out, that you do not have major problems. You expected to lose from loads and indeed you are losing from loads. Your excess interest gains are starting to pick up and your mortality load, while not as high as you hoped it would be, is not yet negative. You know there is some random fluctuation, so you may just sit tight for awhile.

On the other hand, if we had moved some of our high COI charges over to loads (see Graph 5), we could see that we have a problem much earlier. Management reactions are liable to be much more grim when your mortality line goes below zero that quickly. I suppose it is possible for management under this scenario to pat itself on the back and brag about making money on loads, but the fact is the mortality gains have turned negative right away and your interest gains have not yet started to do anything. The conclusion is you have the same product, you have the same underlying experience, you have the same profits each year, but you're going to have different reactions from management.

The next adverse impact we have time to look at is that of lapse. On Table 24 we increased the lapses by 200%. The mortality gain is affected by the lapses, in fact it is cut roughly in half again. It goes down from \$9.00 to about \$4.50. The mortality, you recall, is not tracking as expected. You are losing your mortality gain because your policies are lapsing. The loads are relatively unimpacted but things are not quite as bad as normal because you do not lose as much money for as long. Obviously, if the inforce is less than infinite, you are going to have to revise your company's expense rates. Surrender charges here are actually a larger source of gain, up an entire \$1.00 from \$3.30 to \$4.30, which is about 40% of our entire original profit. Interest gains are not as high as before because no one hangs around long enough to supply a fund for any interest gains. But still, profits on sources are not alarming for several years.

SOURCES OF PROFIT  
 STANDARD PRODUCT SPECIFICATIONS  
 ADVERSE MORTALITY

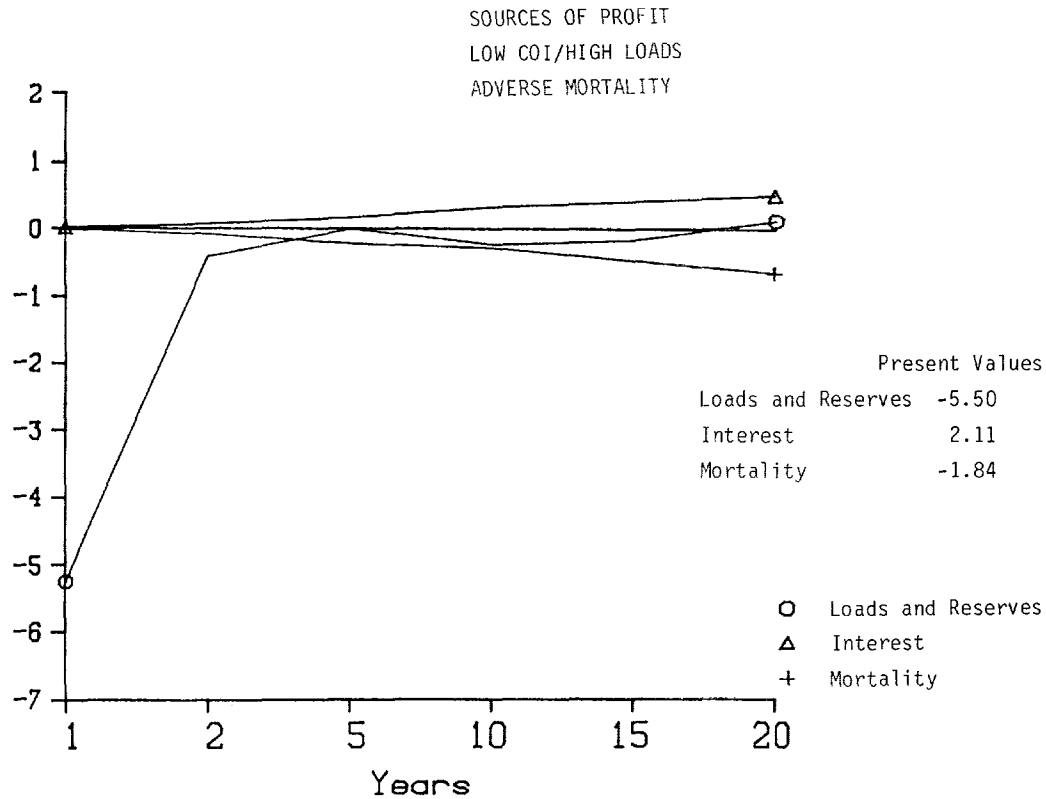


Present Values	
Loads and Reserves	-10.69
Interest	2.13
Mortality	3.13

- Loads and Reserves
- △ Interest
- + Mortality

SOURCES OF PROFIT ANALYSIS

GRAPH 4



PANEL DISCUSSION  
GRAPH 5

## SOURCES OF PROFIT ANALYSIS

### TABLE 24

#### SOURCES OF PROFIT

##### Standard Product Specifications Adverse Lapse

Policy Year	Sources of Profit					Federal Income Tax	Total Profit
	Mortality	Interest	Loads	Surrender Charge	Reserves		
1	\$1.48	\$.03	\$(9.78)	\$1.41	\$3.12	\$(1.31)	\$(2.42)
2	.90	.06	(.16)	1.56	(1.30)	.37	.69
5	.44	.09	(.04)	.39	(.32)	.20	.36
10	.32	.12	(.03)	.08	(.23)	.09	.17
15	.23	.12	(.02)	0	(.10)	.08	.15
20	.16	.11	(.02)	0	0	.09	.16
PV	4.55	.75	(9.19)	4.37	.01	.17	.31

When you allocate the charges away from the COIs (see Table 25) and over to the loads, you obviously get a more favorable answer in the loads column. With the higher lapse rates, again the mortality gains are substantially cut back (from \$.90 to \$.30, or 67% lower, in year 2). Overall profits are down substantially, but analyzing it by the sources of profits we have selected does not become evident until 10 or 15 years out. This is due to the surrender charges actually bumping the profits up more than the losses by any of the other sources.

### TABLE 25

#### SOURCES OF PROFIT

##### Low COI/High Loads Adverse Lapse

Policy Year	Sources of Profit					Federal Income Tax	Total Profit
	Mortality	Interest	Loads	Surrender Charge	Reserves		
1	\$.48	\$.03	\$(8.77)	\$1.41	\$3.11	\$(1.31)	\$(2.42)
2	.30	.06	.44	1.56	(1.29)	.37	.70
5	.18	.09	.23	.39	(.32)	.20	.37
10	.17	.12	.13	.08	(.23)	.10	.17
15	.15	.12	.07	0	(.10)	.08	.16
20	.12	.11	.03	0	0	.09	.16
PV	1.82	.75	(6.39)	4.37	.01	.19	.37

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If you represent this graphically, you can see on Graph 6 that even though you are having terrible lapse experience, if you look at the sources of profit in a manner in which most companies do, namely mortality, interest and loads, nothing is there to alarm you, even 5 or 6 years out. If you are a real clever member of management, you'll notice that all of those numbers are getting close to zero and they are going to add up to zero. Obviously, if there's no business, there is no profit. Perhaps if expenses were taken from the general ledger or if you considered the mortality assumption was adjusted somehow for possible antiselection, something would be done by management. Obviously, if things don't get better soon, management will have to do something.

On Graph 7, where you have reallocated some of the loads from COI deductions over to loads, you can see that mortality is turning negative a little sooner and perhaps management will do something. Again you don't always see what you get.

The last scenario we are going to look at is an adverse expense scenario. To accomplish this we bumped up our maintenance costs from \$20 a policy to \$30 a policy. Many of you might be wondering why it was not \$30 a policy in the first place; well now you know.

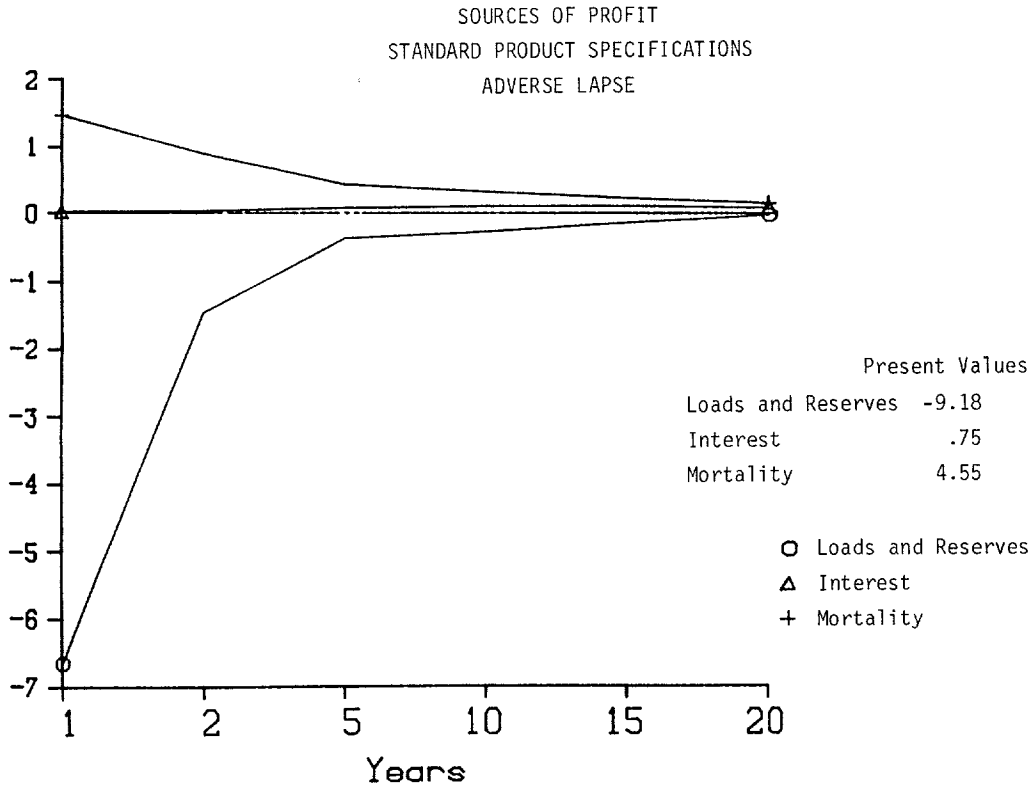
TABLE 26

SOURCES OF PROFIT

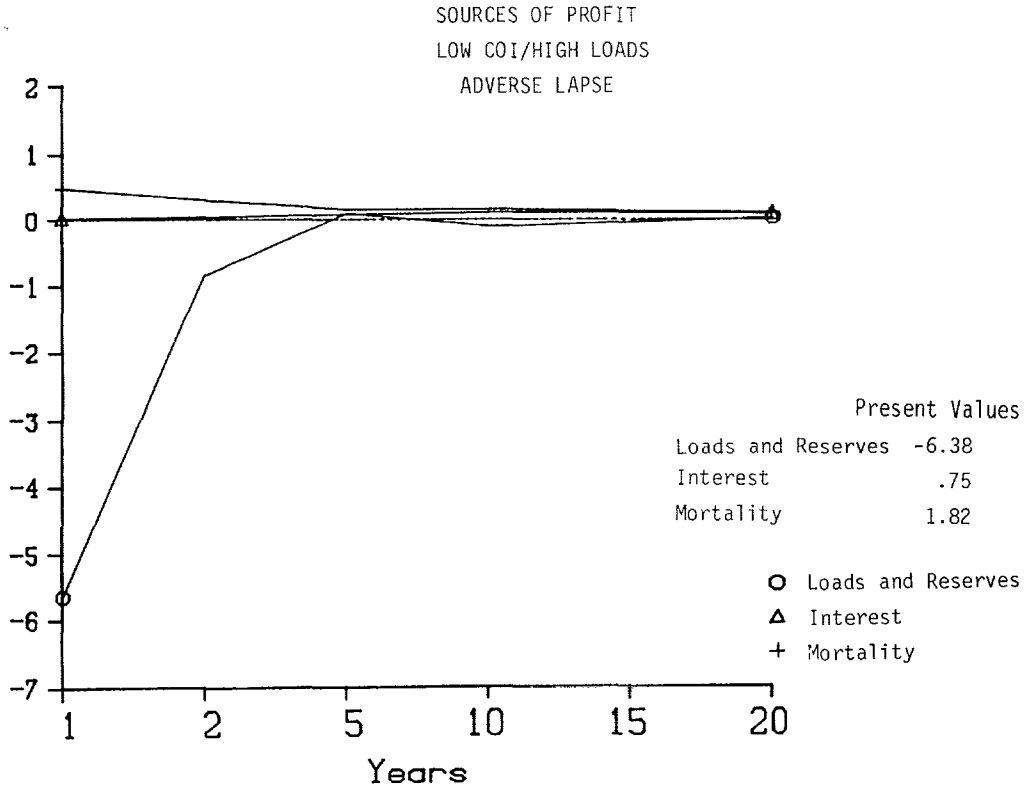
Low COI/High Loads  
Adverse Expense

Policy Year	Sources of Profit					Federal Income Tax	Total Profit
	Mortality	Interest	Loads	Surrender Charge	Reserves		
1	\$ .50	\$ .04	\$(9.74)	\$ .70	\$4.33	\$(1.46)	\$(2.71)
2	.46	.09	.56	1.08	(1.11)	.38	.70
5	.40	.20	.40	.43	(.49)	.33	.61
10	.53	.37	.25	.12	(.54)	.25	.47
15	.62	.48	.16	0	(.40)	.30	.56
20	.61	.55	.08	0	0	.43	.81
PV	4.07	2.15	(6.37)	3.38	(.01)	1.12	2.11





SOURCES OF PROFIT ANALYSIS  
GRAPH 6



GRAPH 7

PANEL DISCUSSION

## SOURCES OF PROFIT ANALYSIS

I have made it a little more complicated and reversed our first two scenarios. We are going to look at our ultimate plan design first, the standard plan design second. Table 26 indicates the results with the low COI and the high loads, and as you can see you are gaining a little bit from loads before reserves, losing a little bit of money every year after you consider your reserve breaks, but in any case probably not enough to get alarmed about. You are going to be lulled to inaction, since the mortality is positive as you have anticipated, and interest gains are starting to creep up.

Under the standard product design (see Table 27) the loss from loads is higher. Remember we have moved our \$1.20 back over to the mortality deduction now. Perhaps management would take some type of action when they are looking at losing \$1.00 a thousand every year. Losses from loads are now roughly twice what they were, which means instead of losing 3% to 5% of premium every year, you are going to be losing 6% to 10% of premium every year.

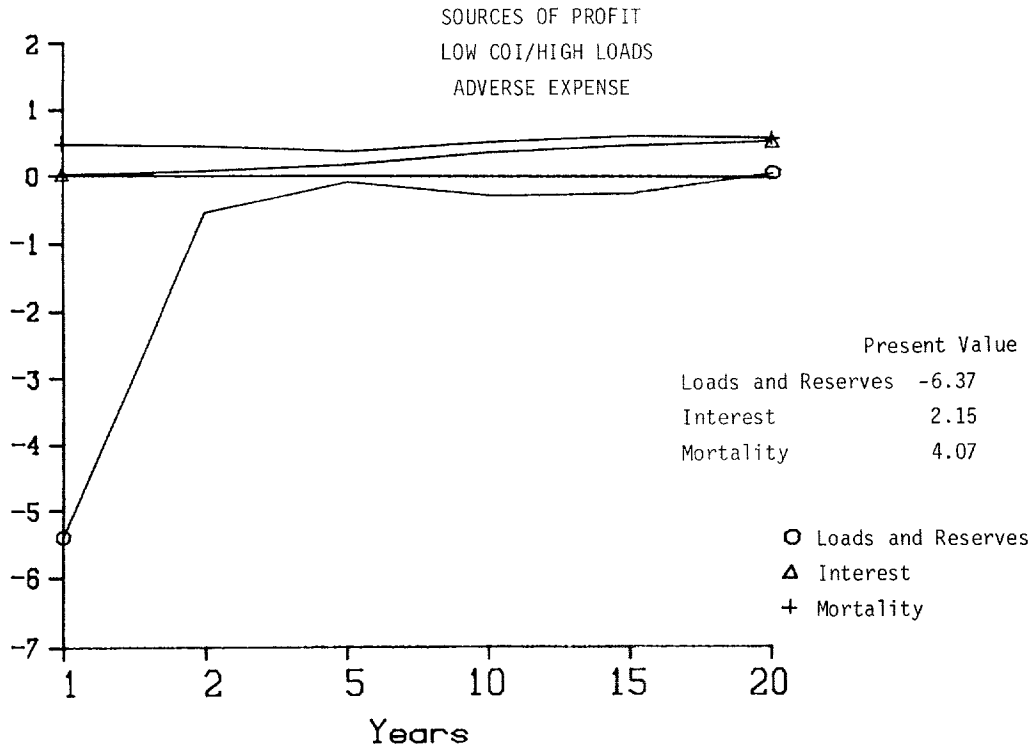
TABLE 27

SOURCES OF PROFIT

Standard Product Specifications  
Adverse Expense

Policy Year	Sources of Profit					Federal Income Tax	Total Profit
	Mortality	Interest	Loads	Surrender Charge	Reserves		
1	\$1.63	\$.04	\$(10.88)	\$.70	\$4.34	(1.46)	\$(2.71)
2	1.36	.09	(.34)	1.08	(1.11)	.38	.69
5	1.02	.20	(.24)	.43	(.48)	.32	.61
10	.98	.37	(.24)	.12	(.56)	.23	.44
15	.95	.49	(.22)	0	(.40)	.29	.53
20	.83	.57	(.20)	0	0	.42	.78
PV	9.14	2.17	(11.65)	3.38	(.02)	1.06	1.97

Graph 8 is a display of Tables 26 and 27. Again this is our low COI/high load plan, and all those lines are probably tracking at least at the right side of zero. No action may be taken for awhile.



PANEL DISCUSSION  
GRAPH 8

## SOURCES OF PROFIT ANALYSIS

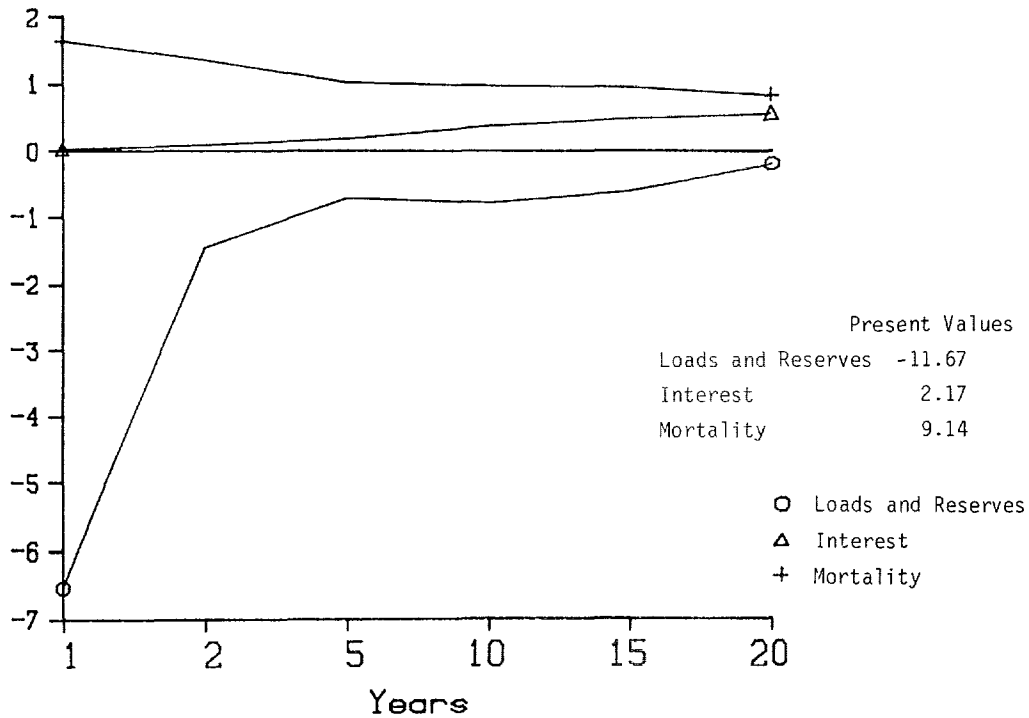
But if you look at our standard plan in Graph 9, you can see the loads and reserves line stays in the red. You lose a lot of money on loads. At some point you are going to have to pull the carpet back out of your office.

I would like to quickly mention a couple of the initial points now that we have been through in the presentation. First of all, the definition of profit by source is not necessarily a clear break. We looked at some examples where we moved loads from one place to another and the sources of profit analysis was changed. The second point I would like to make is that the management's reaction to these tables and graphs is going to be different depending upon how you've selected your sources of profit.

MR. JACOBS: A comment that I wanted to make was in regard to my sources of profit GAAP discussion. I said that it was quite elegant in a composite GAAP environment. You can imagine the releasing of the margins and the resulting profit flows. Try plugging in FASB's new retrospective deposit method and you'll see some unbelievable distortions. GAAP, I thought, was supposed to concentrate on the income stream and make a profitable long term product show profits over its lifetime.

MR. DWIGHT K. BARTLETT III: Table 3 compared internal statements with statutory statements and showed the differences. I wonder if you could characterize the difference between internal statements and GAAP statements, whether there are internal statements are perhaps only unpublished GAAP statements (or whether there are significant differences between internal statements) and how GAAP statements would be prepared.

MR. MCLEOD: I categorize internal statements as statements prepared for management where you're not constrained either by the rules of statutory accounting or by the rules of GAAP accounting. I don't believe that GAAP accounting always gives a good picture of how well a company does in a particular year. I was working with one mutual company just last month where they were moving from statutory reports to GAAP reports for internal purposes. They found that their first year GAAP losses for a particular product were higher than their first-year statutory losses. This is being prepared in accordance with the GAAP accounting principles suggested by their accounting



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GRAPH 9

## SOURCES OF PROFIT ANALYSIS

firm. I think if you follow GAAP accounting principles, you can get some distortions. For internal purposes, if you want to know how well you are really doing, whether you are a stock company or a mutual company, GAAP results may not give the right picture. Looking at that particular table, I'd have to go back to the source documents to find out what the differences are, but I think one of the major differences was investment income and I suspect a large part of that will be recognition of realized capital gains and losses which would apply equally to GAAP and statutory.

MR. DIETER S. GAUBATZ: Just to reinforce what you gentlemen have been talking about, we (Mutual Life of Canada) are one of the few mutuals, and we're not in Charles' survey because we're a Canadian company that actually has an internal reporting method. We have a couple of statements that we use that are highlighted when we do reporting to management. The one that we spend half the time on is the sources of profits. There is one item that I think you might find useful. We separate expected profits from the actual profits. Our first line is our expected profits, and then each of the individual pieces -- we take out of that as a cost the expected profit from each of the individual items. As a result, management will know right away if there are problems.

MR. JACOBS: Along that same line, I tried to keep emphasizing the actual to expected; down one side is expected, down the other side is actual and then you get a variance. The actual shows you a normal income statement, if you have made money at the end of the day. But comparing the actuals to expecteds and the variances, I think it's getting to your point -- it can show management very quickly that our lapses are out of line, they are higher than expected. It's getting to some of the points that Charles made about the indicators. A result of that is you create lapse indicators or mortality indicators, and with a real brief review of that, you know where you're in trouble.

MR. CHARLES R. BRITTON: I'd like to go back to the GAAP gains by source formulas that you talked about in the initial presentation. I'm particularly interested in the required interest on deferred policy acquisition costs, especially if you are looking at an interest-sensitive product, let's say universal life. I assume first of all that the required interest component of your investment margin formula is required interest on benefit reserves less

## PANEL DISCUSSION

required interest on deferred acquisition costs. I assume the required interest on the benefit reserve is the current interest rate that is credited to the policyholders.

MR. JACOBS: Not necessarily. That's the key. You get into what is credited versus what is the GAAP composite method interest rate that you are using.

MR. BRITTON: Let's suppose that you're using your current credited rate for GAAP required interest on benefit reserves. Yet you're using the GAAP interest rate that was fixed at issue on the deferred policy acquisition costs. You have asset segmentation with no surplus allocated to the line of business, so you have invested assets equal to net GAAP liabilities. One thing you will find is as interest rates change, even if you can maintain a constant spread between your credited rate and your earned rate, the investment margin component of that formula will actually go up or down. If interest rates go up, the investment margin drops and it is because the interest rate on the DAC is fixed. It can lead to confusing results if you don't take this into account because as interest rates rise, it can appear that your investment margins are decreasing and vice versa if interest rates are falling. Have you given thought as to how to adjust for that in your formula?

MR. JACOBS: A little bit. It's way beyond the scope of this discussion. A lot of the issue revolves around how GAAP factors are expressed. In a composite GAAP for DAC, it's through a dynamic process that you get your DAC. If interest rates move up or down, that changes your revenue stream which changes your amortization. When interest rates go up, your account values go up and then everything kind of meshes together. I do agree with you that if you lock in a DAC amortization pattern and make it static and then plug it into my formulas, you're going to get absurd results. That is where FASB seems to be headed. The point is it's a dynamic product that we're working with, and you can't force a static accounting method on a dynamic product because you get weird results.

MS. REGINA V. MCDERMOTT: We've seen in these demonstrations that one of the big distortions that can arise is when your persistency assumptions are not realized. When that happens it doesn't come through in the sources of



## SOURCES OF PROFIT ANALYSIS

profit in the deviation from withdrawal expenses. So it seems if you are doing a source of profit analysis, you could spend a lot of your time explaining to management why there are mortality gains and why expense margins look larger than projected, when the cause of that is deviation from persistency. If you are not showing a change in the present value profits of the book, you can be distorting the entire results that don't show up until much later years. Is there a way of getting around this?

MR. JACOBS: I don't know. That is the biggest problem because the change in the lapse rates affects the runoff of policies and down the road you would expect such and such a profit margin from mortality, and it's just not there. I think that's what you're trying to get at. The mathematical solution is to calculate partial derivatives of each of the various elements in these formulas and try to isolate that. Some of the guys at my office tried to do that but it doesn't work real well.

MR. MCLEOD: I think another solution is to value your inforce every year, then an increase in lapse isn't going to show up in a drop in value of your inforce.

MR. JACOBS: The key is the value added concept. You can't get any of this information in a pure statutory environment nor in a GAAP environment. If you are looking at present values and you measure increase in value from period to period, then adverse lapse rates are going to jump out. But your point is well taken. Everything in the insurance business is interrelated. My simple example says we can tear apart each element and lay it on the table and they don't react with one another. That's the furthest thing from the truth. I think it is certainly a step in the right direction instead of the traditional income statement. We're not there yet. I don't know how we can solve your problem, but it is a real problem.

