VALUE CREATION IN INSURANCE – A FINANCE PERSPECTIVE

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Abstract

The ultimate challenge for the management of an insurance company, as for any business, lies in understanding the components of the value creation process, and in controlling and influencing these components in order to enhance the long run value of the firm. The definition of value and its measurement involve important finance concepts extending beyond those traditionally employed by actuarial and accounting professionals.

While the many varied approaches and models applied to the analysis of insurance company financial data differ in their specific purposes and levels of application, they all should share a common end objective: the assessment of profitability, performance, and ultimately value creation. The potential value of these analyses is enhanced if they present a sufficiently broad and complete financial perspective. The value of such analysis is enhanced even further if they are presented in a language that management understands and can relate to familiar standards.

A broad finance perspective on the essential elements of the value creation process in insurance is presented here to promote a more conceptually inclusive framework for insurance financial analysis. External capital costs, often dealt with separately or as an afterthought, are introduced and integrated into the framework alongside internal costs. Understanding the economics of insurance, particularly the important financial concepts and linkages among variables can only help practitioners, such as actuaries and accountants, to become more relevant in a converging financial marketplace. Incorporating these concepts into models currently used in ratemaking and financial analysis can enhance their effectiveness.

1. SUMMARY

The insurance industry spends much time analyzing all the data that it both generates and acquires. However, most of the analysis performed is focused on internal information (such as company revenues and expenses), often at the exclusion of external factors important to long run company success (such as capital flows and its cost). The management of an insurance company and the striving to create value must consider all factors that impact the financial performance of the company, both internal and external. Understanding of the broader financial concepts of value creation in insurance and the subsequent deployment of models that incorporate all the costs and contributors to value is important for the many disciplines and practitioners involved in insurance financial analysis.

For example, although actuarial principles require that capital costs be included as an element of the ratemaking process, debates continue regarding how, or even if, capital should be included and what rate of return should apply [10,11]. Some still refuse to speak the total return (i.e. ROE) language of management [12,13]. Consequently, far too many disjointed approaches exist, which can cause unnecessary confusion and make comparisons of their results difficult. Some models lack financial integrity: they are incomplete and not clear in specifying their underlying conceptual and/or financial assumptions [5,6,10,11]. This lack of financial discipline opens the regulatory process to abuse by constituents with social or other non-financial agendas [14].

Many actuaries and accountants realize the shortcomings inherent in the calendar period orientation of accounting, specifically the lack of a full economic accounting. Both professions have both come to realize the need to broaden their traditional respective areas of analysis to incorporate all aspects of insurer financial performance, on both reported and economic bases. For example, the respective evolutions of Dynamic Financial Analysis ("DFA") and Enterprise Risk Management ("ERM") within the CAS are part of an explicit movement by the actuarial profession to expand its analytical role beyond the liability focus of the past, to include items such as capital and invested assets and the firm in its entirety.

> **Economic value creation occurs when the sum of all sources of revenue (including underwriting and investment income) exceeds the sum of all expenses (including internal operating expense AND external costs of capital), with time value reflected.**

The following is intended to further this effort by presenting a more inclusive modeling framework that reflects vital financial concepts and elements of value creation in an integrated manner. This extends beyond the more traditional internal cost focus to include external costs of capital and valuation

principles. First, it is worth reviewing a few essentials that should be incorporated in any model framework.

2. BASIC BUILDING BLOCKS FOR MEASUREMENT OF VALUE

Three essential building blocks provide a critical foundation for portraying and measuring the value creation process:

1. A complete and tightly linked package of balance sheet, income and cash flow statements provide the basis for the financial analysis to follow.
2. Utilization of policy (or accident) period as the basis of analysis, with calendar period financial statements derived from the contributions of current and prior policy (or accident) periods. This is analogous to loss triangles, applied more broadly to all financial statement items.
3. The joint presentation of items viewed under both conventionally based (GAAP or statutory) accounting rules as well as under economic accounting rules.

While additional effort may be required to create them, the author has learned through experience and observation that failure to include the three basic complements of balance sheet, income and cash flow, eventually will lead to modeling mistakes or inconsistencies, including inability to assess value accurately.

While actuaries often must analyze insurance profitability and risk at the policy period level, regulators and accountants are more accustomed to a calendar period orientation. However, many are not aware that calendar results are a mixture of many contributing policy periods, and are thus an amalgamation of many mismatched bits of premium and expense data. Quite simply, calendar financials are the *end* result of numerous actions, such as pricing, which are managed by policy period. Thus, analysis should never begin with calendar period financials, when policy period financials are available. The focus of key

decisions, centered on actions oriented to the sale of insurance policies, should align with financial analysis.

By providing additional information beyond that under conventional accounting, such as those systems based on GAAP and statutory rules, an economic perspective is broader and presents a more complete valuation picture. While the focus of conventional accounting is necessarily restricted to a calendar period activity basis, the focus of economic accounting is on present and future cash flows, market value and the time value of money not restricted by calendar period. For completeness' sake, to better measure value and understand the linkages between conventional and economic accounting, both views should be available.

In addition to the three fundamental building blocks, the analytical framework should also possess the following attributes:

4. An ability to separate the contributions from the underwriting, investment and finance functions, and
5. A structured discipline for risk / return based decision-making.

Underwriting, investment and finance are different activities which each contribute to the overall performance of the company. Each function is accountable for decisions related to the relationship between the risks and returns that can be realized by that activity. (A detailed discussion of risk and the risk-return relationship is beyond the scope of this paper.) In order to maintain balance and financial discipline throughout the organization, and not expose the company to unnecessary risks in any one area, it is important that there be overall consistency in the decision-making process among them. The contributions that each makes to the overall return of the company, and the risks associated with generating those returns, should be judged similarly. In order to understand the distinct contributions to

value creation and the corresponding risks from the three functions, the analytical framework must be capable of separately measuring each of them as part of a unified framework.

A model framework that reflects these five important features will provide the key economic measures that are needed to assess value creation.

3. BASIC COMPONENTS OF VALUE CREATION

To add economic value, the cost of insurance company funds acquired must simply be less than the value derived from their investment. Insurance companies derive funds from equity, debt, and policyholder funds that support net insurance liabilities. If the income on invested assets is less than the cost of those funds, then economic value added is negative (i.e. value is being lost). While this simple view does not fully reflect the role of underwriting, particularly with respect to the dimension of risk in the pricing process, the fact is that from a purely financial perspective, the underwriting process serves simply as a source of funds and value is created primarily from the investment of those and other (capital) funds. These principles will be explored more deeply beginning with an explanation of the essential elements that together create value in insurance.

The important variables of the value matrix are:

VALUE MATRIX

Item	Amount	Funds Rate	Functional Accounting
Source / Cost of Funds: to calculate respective total cost, multiply amount by rate (i.e. $-C_u S_u$)			
Underwriting Equity – surplus (equity) supporting underwriting risk	S_u	$-C_u$	Underwriting
Investment Equity – surplus (equity) supporting investment risk	S_i	$-C_i$	Investment
Debt – non equity capital introducing leverage to reduce the cost of capital	S_d	$-C_d$	Finance
UW Liabilities – obligations to policyholders (e.g. loss reserves payable)	L	$-C_L$	Underwriting
Use / Value of Funds: to calculate value created, multiply amount by rate (i.e. $R_i L$)			
Underwriting Funds – funds available to invest (at low risk) prior to loss and other liability payment (float)	L	R_i	Underwriting
Underwriting Equity – surplus funds available to invest (at low risk)	S_u	R_i	Underwriting
Inv. Lift on Underwriting – funds provided by underwriting available to invest (higher risk investments)	$L + S_u$	$R_a - R_i$	Investment
Investment Equity – surplus funds available to invest (higher risk investments)	S_i	R_a	Investment
Debt – non equity capital assets available to invest (higher risk investments)	S_d	R_a	Finance
Total	A	R	

These variables are defined as:

S_u: Surplus (equity) supporting underwriting risk
S_i: Surplus (equity) supporting investment risk
S_d: Debt
L: Net insurance liabilities
R_i: Low-risk investment rate, after-tax
A: Total invested assets
V: Net value added

C_u: Cost of underwriting surplus
C_i: Cost of investment surplus
C_d: Cost of debt
C_L: Cost of liabilities
R_a: Actual investment rate, after-tax
R: Total value return on assets

Note that the total funds from underwriting ($L + S_u$) are a source of funds to investment whose cost is R_i, the low-risk base earnings commitment to underwriting for its use. The value of those funds to investment is determined by the spread it earns above this base ($R_a - R_i$).

While equity (and its cost) may be viewed as under the functional control of finance, it is considered part of either underwriting or investment for the purpose of determining rates of return and value creation. This is because those areas are responsible for earning a return on the risk-based equity supporting their respective operations and their financial performance is thus connected to it.

Debt considerations within the finance function are much different from the underwriting and investment risk / return considerations. Typically the effect of debt will indicate a net cost, which reflects that borrowing rates are generally greater than the rate at which these funds can be invested. However, indirect benefits of debt include a reduction in insurance premium leverage and a likely improvement in financial ratings. Furthermore, equity costs are likely to decline and the potential exists for greater, more profitable business growth.

The value created (*V*) is the net sum of the products of the amounts of funds and the applicable funds rates, whether costs of value contributors. The amount of value created can be determined by any of the five following alternative formulae, presented simply to emphasize different perspectives. (Note that the calculation of an *economic value created* requires that this figure be discounted to present time using the cost of capital as a discount rate.) The most basic view of value created is total investment income less the total cost of funds:

(1) *Basic View:* $V = R_a (S_u + S_i + S_d + L) - (C_u S_u + C_i S_i + C_d S_d + C_L L)$.

Funds are derived from three basic sources - surplus (equity), debt and policyholder funds that support net liabilities. Equity and debt together represent total capital. The net of premium, loss and expense

that remains in the company to support net future liability obligations is also an important source of funds. This source may have an associated cost, if business is written at an underwriting loss. However, profitably written business (i.e. under 100 combined ratio) has a negative cost, in effect producing value directly. In such instances, policyholders are effectively paying insurers to hold their money. This may be a necessity if interest rates are low and also to reflect the uncertainty and risk that the insurer is assuming from the policyholder. In some cases where risks are significant a combined ratio below 100 is absolutely necessary to provide adequate profits and create value.

Distinguishing between underwriting and investment risk equity is optional, but is strongly suggested in order to permit the separate assessment of the underwriting and investment functional contributions to the creation of value. This more traditional "insurance" view, which reflects these functional contributions separately, is total underwriting return plus total investment return plus finance return:

(2) *Functional Total Return View:*

$$V = [(R_i - C_L)\, L + R_i\, S_u] + [(R_a - R_i)\,(L + S_u) + R_a\, S_i] + [((R_a - C_d)\, S_d - C_u\, S_u - C_i\, S_i] \ .$$

where V = *[Underwriting Return] + [Investment Return] + [Finance Return]*

The return from underwriting operations represents the spread between the cost of liability funds and what they can earn when invested at a low risk yield, together with the low-risk investment earnings on the supporting underwriting risk surplus (the first bracketed part of (2)). Underwriting returns are judged on a "benchmark", low-risk investment standard basis.

Similarly, return from investment is the margin earned from the spread of actual yield over the low risk yield on the underwriting related funds (liabilities plus underwriting surplus), plus the investment earnings on the supporting investment risk surplus (the second bracketed part of (2)). The net financing costs calculation reflects that the net cost of debt is the difference between the borrowing rate and what

those assets earn while invested (along with other company assets). To reflect taxes, all items are expressed at their after-tax values. Since equity costs (C_u, C_i) are not tax deductible to the company, the pre-tax basis is the post-tax basis.

A slight repackaging of (2) leads to the following form that better reflects the net value creation contribution from each of the underwriting, investment and finance functions:

(3) *Value Creation View:*

$$V = [(R_i - C_L)\, L + R_i\, S_u - C_u\, S_u] + [(R_a - R_i)\, (L + S_u) + R_a\, S_i - C_i\, S_i] + [(R_a - C_d) S_d],$$

$$\text{or } V = [\, V_u] + [\, V_i] + [\, V_d\,],$$

where V_u , V_i , *and* V_d represent value added from underwriting, investment and finance, respectively.

Note that *economic rates of return* can be defined as $E = V / (S_u + S_i + S_d)$, $E_u = V_u / S_u$, $E_i = V_i / S_i$, and $E_d = V_d / S_d$, corresponding to the total, underwriting, investment and debt value creation components, respectively. Therefore, the value created by each function equals the return less the cost for each with the rate of return being the return amount in ratio to the amount of equity or debt, respectively.

A more "pure" operationally focused view on underwriting and investment, without the implicit allocation of equity to underwriting and investment, is operating return from underwriting plus operating return from investment plus net finance return (usually a net *cost* of capital):

(4) *Pure Operations View:*

$$V = [(\,(R_i - C_L)\, L] + [(\,(R_a - R_i)\, L] + [(R_a - C_u)\, S_u + (R_a - C_i)\, S_i + (R_a - C_d)\, S_d] \;.$$

where V *= [Underwriting Operating Return] + [Investment Operating Return] + [Finance Net Capital Return]*

Here the net cost / value of all capital is combined together, and the return from underwriting and investment is viewed with respect to liability funds only. Since the weighted average cost of capital

(WACC) is $(C_u S_u + C_i S_i + C_d S_d) / (S_u + S_i + S_d)$, the net cost of capital in this view is (WACC – R_a) x total capital. This is the WACC excess over the actual rate at which capital earns when invested. It should be noted that capital in insurance represents a financial cushion that exists as an invested asset. It differs from the non-earning investment of capital in plant and equipment in manufacturing.

Insurance risk is largely dominated by the uncertainty and volatility of losses and reserves over time. The role of surplus to act as a financial buffer against this risk is often addressed in modeling by controlling the initial needed level of underwriting surplus and the subsequent timing of its release by a linkage to liabilities, primarily driven by the runoff of reserves as claims are paid. Similarly, investment surplus is often maintained through a linkage to invested assets. In other words, insurance equity is largely proportional to reserves, and investment equity proportional to invested assets.

Given an underwriting leverage factor $F_u = L / S_u$, investment leverage factor $F_i = (L+ S_u,) / S_i$, debt / equity factor $F_d = S_d / (S_u + S_i)$, and assuming $C_u = C_i = C$, then (3) can be restated as follows:

(5) *Fundamental Factors View:*

$V=L [(R_a – C_L) – K (C–R_a) – K F_d (C_d–R_a)]$, where $K = 1/ F_u + (1+1/ F_u)/ F_i$.

This shows that the key drivers of return (and risk) in insurance are liabilities (L), the cost of liabilities (C_L), investment returns (R_a), and leverage, in conjunction with the costs of equity (C) and debt (C_d). This is a mathematical expression of the basic fact that insurance consists fundamentally of underwriting, investment and leverage, and that value is created in relation to capital costs.

Operating return represents the spread between the return earned on funds held less the cost of those funds. The total return (essentially the traditional ROE) represents the operating return leveraged in relation to supporting risk equity, plus the investment return on the equity itself. The operating return

(O_u) and total return (T_u) for underwriting are defined, respectively, by the following:

(6) $O_u = R_i - C_L$ and (7) $T_u = O_u\ (L / S_u) + R_i$.

Equation (7) is the first bracketed expression for underwriting return in (2) divided by S_u. The operating return (O_i) and total return (T_i) for investment are defined, respectively, by the following:

(8) $O_i = R_a - R_i$ and (9) $T_i = O_u\ [\ (L + S_u)/ S_i] + R_a$.

Equation (9) is the second bracketed expression for investment return in (2) divided by S_i.

Note that underwriting leverage is in relation to liabilities, whereas investment leverage is in relation to the invested asset sum of liabilities and underwriting equity, since this is the investment base that is being managed to higher risk investments by the investment function (i.e. the investment lift). By this division, it is possible to quantify the total return contribution separately for the underwriting and investment functions.

The "traditional" total return (on equity) (T) is the composite of the underwriting and investment total returns. This is expressed as follows:

(10) $T = [\ T_u S_u + T_i S_i\ ] \ / \ [\ S_u + S_i\ ]$.

The total return on total capital (T_c) is determined as:

(11) $T_c = [\ T_u S_u + T_i S_i + R_a S_d\ ] \ / \ [\ S_u + S_i + S_d\ ]$.

Note that the total economic rate of return and those for underwriting, investment and finance can be expressed simply as: $E = T_c - \text{WACC}$, $E_u = T_u - C_u$, $E_i = T_i - C_i$, and $E_d = R_a - C_d$.

The analysis of insurance must reflect the multi-year nature of the cash flows that generally follows well after the initial policy sale. When policies are sold, premium collections and expense payments occur relatively quickly. However, the key determining cost of insurance is claims payments that can span

many years subsequent to the policy period in which the insurance coverage was in force and the original claim generating incidents occurred. This means that an economic perspective is important in order to properly reflect the amount and timing of value that is generated. The specific meanings and calculations of the funds rates noted above will be discussed in the next section.

First, the following brief thoughts are offered as a point of discussion and perhaps to provide a basis for further risk / return model development. Most of the variables in the value matrix are subject to variability. Liabilities (L) and their cost (C_L), for example, are both very volatile and have a significant effect on value. (Note that this is the composite of the amounts of premium, loss and expense and the timing of their cash flows.) The author suggests that a focus on value (V) via equations (1) through (5) would provide a basis for dealing with risk and return consistently across all sources of cost and value. Given assumptions as to the distributions of each of the underlying variables, the resultant distribution of V provides a single unifying basis for assessing risk and return of each contributor to cost or value creation. This would allow for judging the underwriting, investment and finance functions all by a common performance standard, such as in equation (3). If one were looking for a relatively simple, tight package containing the essential value drivers of insurance, then this framework might be worth considering.

4. THE FINANCIAL MODEL FOR VALUATION

As noted earlier, the multi-year dimension of the insurance financial transaction requires that time value and other economic principles be considered in the determination of economic value creation. An example will be used to demonstrate the key concepts and show how the key funds rates, measured economically, provide the information needed to support the calculations presented in (1) through (5). The following example shows how a single policy year emerges over its financial lifetime and contributes to future calendar period results and value. To achieve a full calendar accounting all current and prior policy periods must be modeled and calendar contributions from all of them properly aggregated.

This example provides high-level balance sheet, income and cash flow statements. Various rate of return calculations are also shown to demonstrate the equivalence between conventionally reported rates of return, IRR and net present value rates of return, assuming certain risk-based, economic rules are followed to control the flow of surplus and to distribute profits. Basically, surplus contributions are controlled over time to maintain a 3/1 liability to surplus relationship and profits are released (as dividends) proportional to liability exposure and settlement over time. Conventional net income is not the basis for the determination of dividends. A most important result is the development of the economically based measures of the funds rates that determine value created. These financial assumptions form the basis for the example presented:

For underwriting function activities:

- 103.1% Combined ratio
- $9,700 Premium, collected without delay when written
- $10,000 Loss, single payment at end of year 3
- $0 Expense
- 35% Income tax rate, no delay in payment
- 6.0% Low-risk investment interest rate before-tax, 3.9% after-tax
- No loss discount tax or unearned premium tax
- 3.0 Liability/surplus ratio
- 15.0% Cost of underwriting equity

For investment function activities:

- 6.2% Investment interest rate before-tax, 4.65% after-tax, assuming a 25% tax rate
- 20% Investment equity / underwriting equity ratio, equivalent to using a 20:1 (liability plus underwriting equity) / investment equity ratio
- 15.0% Cost of investment equity

For finance function activities:

- 6.2% Investment interest rate before-tax, 4.65% after-tax, assuming a 25% tax rate
- 25% Debt / total equity ratio
- 8.0% Cost of debt before-tax, 5.2% after-tax.

Simplified balance sheet, income and cash flow statements are shown for this example in Exhibit 1. The rules governing the flow of surplus are as follows: (1) the level of surplus is maintained at a 1/3 ratio to loss reserves, (2) after-tax investment income on all capital (surplus and debt) is paid to the shareholder as earned, and (3) operating earnings from underwriting and investment of underwriting funds are distributed in proportion to the level of insurance exposure in each year, measured by loss reserve level, relative to the total exposure over the policy year's financial lifetime. Since loss reserves are level at $10,000 in each of the three years, operating earnings are distributed to the shareholder equally in each year. The cost of debt is paid as it is incurred.

Three "levels" of return exist within an insurance company with respect to the underwriting function. The first is the underwriting rate of return, which is how much the company "earns" (a cost when writing above a combined ratio of 100) on pure underwriting cash flows, before reflecting investment income on the float. If negative, this is the company's cost of policyholder supplied liability funds. The second, operating return, reflects what the company earns on underwriting when investment income on the float is netted against the cost of funds. This is the "risk charge" to the policyholder for the transfer of risk to the company. The third, the total (levered) return, is the net result of underwriting and investment income from operations together with investment income on underwriting risk surplus.

EXHIBIT 1
THREE PERIOD DEMONSTRATION EXAMPLE
BALANCE SHEET, INCOME, CASH FLOW and RATES OF RETURN

	Calendar Period				Total All		Benchmark
	1	2	3	4	Periods	L/S	NPV
BALANCE SHEET (Beginning of Period)							
Invested Assets	14805	14868	14932	-0	44605		41705
Net Ultimate Ins Liabilities	10000	10000	10000	0	30000	3.00	27804
Unbooked Income	0	0	0	0	0		0
Retained Earnings	-195	-132	-68	-0	-395		
Underwriting Risk Surplus	3333	3333	3333	0	10000		9268
Investment Risk Surplus	667	667	667	0	2000	15.00	1854
Additional Capital	1000	1000	1000	0	3000	10.00	2780
Total Capital	5000	5000	5000	0	15000	2.00	13902
INCOME BEFORE-TAX (During Period)							
Earned Premium	9700	0	0	0	9700		9700
Loss & Loss Expense	10000	0	0	0	10000		10000
Underwriting Income	-300	0	0	0	-300		-300
Total Investment Income	918	922	926	-0	2766	6.2% Inv Yield	
Additional Capital Cost	-80	-80	-80	-0	-240		
Total Net Income	538	842	846	-0	2226		
INCOME AFTER-TAX (During Period)							
Underwriting	-195	0	0	0	-195		-195
Inv Inc Net Liabilities	390	390	390	0	1170		1084
Inv Inc Ret. Earns.	-8	-5	-3	-0	-15		
Inv Inc Surplus	130	130	130	0	390		361
Underwriting Net Income	317	515	517	-0	1350		1251
Inv Inc Lift On PH related assets	100	100	100	0	300		278
Inv Inc on Inv Surplus	31	31	31	0	93		86
Investment Net Income	131	131	131	0	393		364
Inv Inc on Additional Capital	47	47	47	0	140		129
Cost of Additional Capital	-52	-52	-52	-0	-156		-145
Net Income on Additional Capital	-6	-6	-6	0	-17		-15
Total Net Income	443	640	643	-0	1726		1600
CASH FLOW (Beginning of Period)						**IRR**	
Premium Receipts	9700	0	0	0	9700		9700
Loss Payments	-0	-0	-0	-10000	-10000		-8916
Underwriting Tax Payment	105	-0	-0	-0	105		105
Net Underwriting Cash Flow	9805	0	0	-10000	-195	**-0.7%**	
Net U/W incl Liab Funding & Ret Earns Inv Inc	10000	-70	-70	-10070	-210	**-0.7%**	-195
Net Operating Cash Flow inc Inv of Float	10000	320	320	-9680	960	**3.2%**	889
Net Shareholder incl Inv on Surp and Lift	4000	-581	-581	-4581	-1743		-1615
Additional Capital Flow	1000	6	6	-995	17		
Net Cash Flow	14805	63	65	-14932	0		
SURPLUS FLOW (Beginning of Period)							
Underwriting Net Flow	3333	-450	-450	-3783	-1350	**13.5%**	
Investment Net Flow	667	-131	-131	-798	-393	**19.7%**	
Net Shareholder Flow	4000	-581	-581	-4581	-1743	**14.5%**	
Net Total Capital Flows	5000	-575	-575	-5575	-1726	**11.5%**	
Net Cash Flow excluding Debt Cost	5000	-627	-627	-5627	-1882	**12.5%**	

RATES OF RETURN					Nominal Return	IRR	NPV Return
Underwriting Return		-0.7%	-0.7%	-0.7%	-0.70%	-0.70%	-0.70%
Investment on Return on Float		3.9%	3.9%	3.9%	3.90%	3.90%	3.90%
Und Operating Return		3.2%	3.2%	3.2%	3.20%	3.20%	3.20%
Total Underwriting Return on Underwriting Surplus		13.5%	13.5%	13.5%	13.50%	13.50%	13.50%
Inv Operating Return (Lift on PH Related Assets)		0.8%	0.8%	0.8%	0.76%	Inv Spread	
Total Investment Return on Investment Surplus		19.7%	19.7%	19.7%	19.65%	19.65%	19.65%
Total Return on Surplus		14.5%	14.5%	14.5%	14.52%	14.52%	14.52%
Total Return on Total Capital		11.5%	11.5%	11.5%	11.51%	11.51%	11.51%
Total Return on Total Capital excl Debt Cost		12.5%	12.5%	12.5%	12.55%	12.55%	12.55%

ECONOMIC VALUE CALCULATIONS					Total All		
Return Achieved vs Cost	**Avg Wtd Cost**				**Periods**		**NPV**
Underwriting	15.0%		-1.5%	-1.5%	-1.5%	-1.5%		-1.5%
Investment	15.0%		4.7%	4.7%	4.7%	4.7%		4.7%
Finance (Additional Capital)	5.2%		-0.6%	-0.6%	-0.6%	-0.6%		-0.6%
Total	13.0%		-0.5%	-0.5%	-0.5%	-0.5%		-0.5%
					Created Value	**Discount Rate**	**BVC**
Value Created							
Underwriting			-50	-50	-50	-150	15.0%	-114
Investment			31	31	31	93	15.0%	71
Finance (Additional Capital)			-6	-6	-6	-17	5.2%	-15
Total Value Created			-25	-25	-25	-74	13.0%	-59
Embedded Value	**Initial Contribution**						
Underwriting	3333	3219	2828	2488	-0		
Investment	667	737	624	524	-0		
Finance (Additional Capital)	1000	985	941	899	-0		
Total Embedded Value	5000	4941	4392	3911	-0		

Note: Initial period Embedded Value is equal to the sum of initial contributed equity / capital and BVC

Benchmark Net Present Value discounted at the low-risk underwriting investment rate. BVC discounted at equity / debt cost rate.

Investment returns can be viewed similarly at several levels. The investment function generates a yield lift on the funds provided by underwriting (liabilities and underwriting equity). The base "cost" of these funds to the investment function is the low risk yield already credited to the underwriting function. The operating return earned by investment reflects what is earned on actual investments netted against this cost. The total (levered) investment return is the net result of investment income generated from investment operations together with the total investment income on supporting investment risk surplus.

These rates of return can be determined by either a cash-flow-based internal rate of return (IRR) calculation or by relating income earned to the amount invested (or asset equivalent liability). It is important to note that IRR calculations are meaningful for cash flows other than just at the shareholder level. The income versus investment approach (i.e., "ROE-like") relates the income over the full three-year aggregate financial life of the business to the investment base over this same period. This calculation can use either nominal (i.e., undiscounted) or present value (discounted, but without risk-adjustment) dollars. All three approaches should produce the same result, assuming risk-based economic rules are used to control capital flows and to distribute profits. In addition, the total return realized at the shareholder level via dividends is identical in each year. This attribute follows from the fact that the rules used to control the flow of surplus are the same as those used to distribute profits. Note that if risk-adjustment were used in the present-value calculation of income, the present value-based total shareholder returns thus generated would equal the risk-free rate.

The cost of liabilities, or underwriting generated funds, is based on the net of premium, loss and expense cash flows, including the funding of liabilities to nominal levels via an internal transfer from the shareholder to the policyholder account. The IRR for this series of cash flows is (0.7%). Equivalently, this can be derived as the ratio of the present value of underwriting income of –$195 divided by the present value of underwriting liabilities of $27,804. On a nominal basis this is -$210 divided by

$30,000, where the -$210 includes -$15 due to the loss of investment income on negative retained earnings. (To fully fund liabilities and reconcile with accounting earnings on a nominal basis special attention must be paid to what is traditionally referred to as “retained earnings”. This is a critical balancing item that reflects the amount of undistributed accounting profits that remain after the dividend of profits.)

The operating return is equal to the after tax investment rate of 3.9% less the 0.7% funds cost, or 3.2%. This can be calculated in three alternative ways. (1) The net cash flow inclusive of underwriting and investment income generates an IRR of 3.2%. (2) The present valued operating income of $889 is a 3.2% return on the $27,804 present valued liabilities. (3) The nominal operating income of $960 is a 3.2% return on the $30,000 total balance sheet policyholder supplied float upon which these earnings were generated.

The total underwriting return on underwriting risk equity, which includes underwriting income and investment income on both float and equity, is also derivable in three ways. First, the net shareholder flows produce an IRR of 13.5%. The “ROE-like” calculation of income in ratio to equity is $1,251 divided by $9,268 on a present value basis and $1,350 divided by $10,000 on a nominal basis, both 13.5%. It should be noted that the rate of return based on the dividend of underwriting-based profits is also 13.5% in each period. (It can’t be buttoned up any tighter than this!)

If investment yields vary over time, as opposed to the simple flat yield curve assumed in this example, refinements in the discount rates and the dividend rule are necessary to maintain the tight linkages shown here, and some corresponding variations in return over time will emerge, particularly in the period dividend return.

The 0.75% operating rate of return on investment is simply the difference between the actual earnings rate of 4.65% and the low-risk rate credited to underwriting of 3.9%. The total investment return on investment risk equity, which includes the investment lift on underwriting funds and underwriting equity and the investment income on investment equity, is also derivable in three ways. First, the net shareholder flows from investment operations produces an IRR of 19.7%. The “ROE-like” calculation of income in ratio to equity is also 19.7% on both a present value basis and on a nominal basis. The rate of return in each period based on the dividend of investment profits is also 19.7% in each period.

The total return on total capital is also derivable in three similar ways. The IRR and the present value and nominal value ratios of total income to total capital all produce a rate of return of 11.5% including the cost of debt and 12.5% excluding it. The “dividend” returns in each period match these as well.

5. MEASURING VALUE CREATION

The measurement of value created can proceed using the rates of return provided by the financial model. The following is a recap of the value matrix for the example presented above. Note that the figures presented are the "Total All Periods" nominal policy-lifetime values from Exhibit 1, rather than the net present value figures, so that results are additive. This is what would be observed in a calendar period accounting of a firm that was at "steady state" (i.e. identical successive policy period performance without growth).

Item	Amount	Funds Rate	Net Cost / Value	Functional Accounting
Source / Cost of Funds				
Underwriting Equity	10,000	-15.00%	-1,500	Underwriting
Investment Equity	2,000	-15.00	-300	Investment
Debt	3,000	-5.20	-156	Finance
Underwriting Liabilities	30,000	-0.70	-210	Underwriting
Use / Value of Funds				
Underwriting Liabilities	30,000	3.90%	1,170	Underwriting
Underwriting Equity	10,000	3.90	390	Underwriting
Inv. Lift on Underwriting	40,000	0.75	300	Investment
Investment Equity	2,000	4.65	93	Investment
Debt	3,000	4.65	140	Finance
Total	45,000	-0.16	-74	

The net value created is a negative (74), which represents a failure to earn the cost of capital. (To calculate the *economic* value created, the cash flows underlying this figure must be discounted at the cost of capital rate of 13.0%, which results in a value of (59), as shown by the net present value figures in Exhibit 1.) The many various returns of interest are recapped below.

Key Rates of Return

Un-levered "pure" returns

C_L:	-0.70%	Underwriting liability return (cost of policyholder supplied funds)
R_i:	3.90	Investment return on underwriting funds
O_u:	3.20	Operating return from underwriting operations (risk charge)
O_i:	0.75	Investment lift on benchmark underwriting assets
R_a:	4.65	Investment return on invested assets

Levered returns

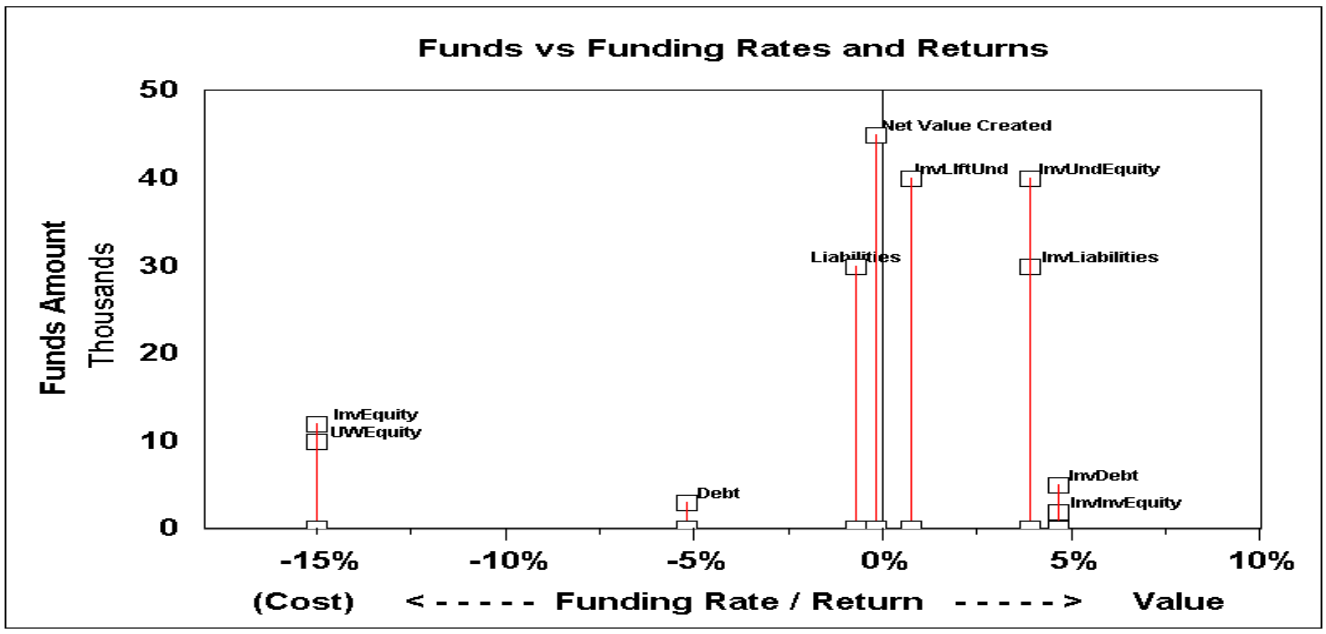
T_u:	13.50	Underwriting total return on underwriting equity
T_u:	19.65	Investment total return on investment equity
T:	14.52	Total insurance return on total equity
T_c:	11.51	Total return on total capital including debt cost
T_c:	12.55	Total return on total capital excluding debt cost (see section 8.)

Economic returns

E:	-0.49	Economic total return on total capital (12.55-13.04)
R:	-0.16	Economic total return on invested assets
E_u:	-1.50	Economic underwriting return on underwriting equity (13.50-15.00)
E_i:	4.65	Economic investment return on investment equity (19.65-15.00)
E_d:	-0.55	Economic debt return on debt capital (4.65-5.20)

The value creation components can be viewed graphically (Figure 1) to get a better sense of their relative degrees of influence. The x-axis scale represents the funds rates, either a cost (left side) or a value contributor (right side). The y-axis scale represents the amounts of funds to which the rates are eventually applied (i.e. multiplied). This should be viewed as a see-saw with the fulcrum to be determined as the point along the x-axis which causes costs and value to be in balance. Both the weights sitting on top of the see saw (the amounts of funds) and the distance from the to-be-determined fulcrum (the funds rates) are determining factors. In this example with a negative total created value, the point of balance is a negative return on assets of (0.2%), the point at which "net value created" sits.

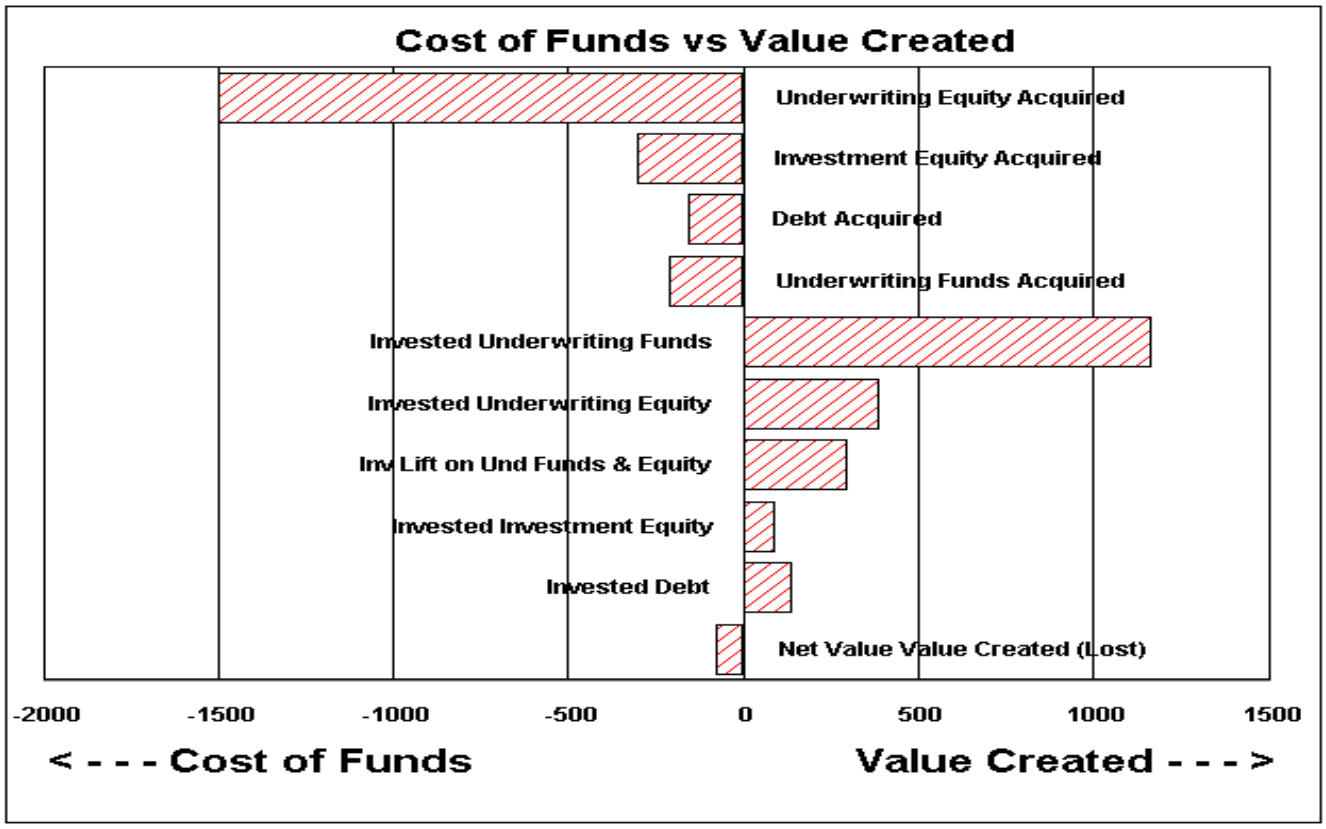
FIGURE 1 - COSTS AND CONTRIBUTORS TO VALUE CREATION



The net impact of the amounts of funds and funds rates are shown in Figure 2. The net costs and value contributions are the products of the amount of funds and funds rates shown in the value matrix. From this view, it is easy to judge the most significant drivers of cost and value. Clearly, the cost of equity is the major cost contributor, while the investment value of underwriting funds acquired from the policyholder is the major value contributor.

The significant amount of capital costs and their impact on net value created serves to highlight the authors concerns as to if and how ratemaking models deal with issues of capital and capital costs. The author's observation is that many models do not explicitly integrate capital costs into the ratemaking equation. Often this is addressed simply by comparison of the resultant rate of return generated by a particular rate to a "reasonable" cost of capital figure. The magnitude of the impact of capital cost and its connection to value creation is perhaps not as widely recognized as it should be. By incorporating this aspect into ratemaking and other activities, Actuaries enhance their position as key role-players in the converging financial marketplace where knowledge of a broader and more complete financial perspective is critical.

FIGURE 2 - THE ECONOMIC COST AND VALUE CREATION COMPONENTS (THE PRODUCT OF FUNDS AND FUNDS RATE)



The model framework presented here has intentionally provided delineation between the underwriting, investment and finance functions and their respective performance judged against individual benchmark standards. From using equation (3) and summing the appropriate items in the value matrix based on functional accountability, and also as shown in Exhibit 1, Underwriting lost value of 150, Investment added value of 93, and Finance lost value of 17 in this example. When discounted at the cost of capital, the respective contributions to economic value created are (114), 71, and (15) which total (59).

These amounts represent the "benchmark value created" (BVC) for underwriting, investment and finance. By comparison, the traditional method of determining *economic value added*, or EVA, only provides a total, firm level view, and no attempt is made to judge the separate contributions of underwriting, investment and finance against their own individual capital cost benchmarks. The standard application of EVA to insurance is also problematic in that it uses calendar year net income as

its starting point. Appropriate insurance valuation requires a policy period orientation coupled with economic accounting. The (59) in this example is EVA when created under an overall framework of benchmark (i.e. economic, risk-based) rules and valuation.

It is worth noting that the embedded value approach that is emerging on the life side of the insurance industry differs in the form of presentation, but is consistent with and reconcilable in result to the valuation material presented here (assuming a sufficiently complete model that can do it, of course). As noted at the bottom of Exhibit 1, the beginning embedded value is the sum of BVC and capital contributed at the time of policy inception. Embedded value demonstrates the *remaining economic value created* that exists at each point in time based on the remaining capital and future profits to be distributed, adjusted to the time of inception by discounting at the cost of capital. The typical format of presentation (not shown here) provides a breakdown of the embedded value into two components: (1) contributed nominally valued capital and (2) the remainder, which is referred to as the value of "in force" business. In this way, embedded value is linked to the levels of published capital (usually statutory) that remain on the balance sheet at each interval in time.

6. RATEMAKING

The portion of ratemaking practices that deals with such issues as profit margins and the cost of capital is a collection of many diverse approaches that do not provide as complete a financial perspective or as helpful of a linkage to overall company financials as the author believes they can. The historical focus on internal cost drivers, while understandable, can be supplemented to more formally address external capital costs and other financial market considerations.

Furthermore, modelers, including actuarial rate-makers, tend to talk like priests speaking Latin - elegant, complex, and appropriate to the situation, but not understood by anyone else. By developing more complete and integrated financial models, ratemaking can also be reworked in the language of

management - which is total return and economic value - which keeps score using things such as return on equity and return on capital.

Ratemaking models that do not explicitly address capital cost issues are at a disadvantage, since this absence makes this source of justification for rate action more difficult to demonstrate. The direct integration of both capital costs and a more complete financial perspective into ratemaking models could avoid some of the confusion that clouds discussions of rate adequacy in regulatory applications. Certainly, this would address the concern that significant costs of capital are not being properly reflected in rates.

To ensure that capital costs are reflected, and to speak the language that management and financial markets employ, it is clear that development of more financially complete ratemaking models that reflected all elements of value creation would be beneficial. Coupled with the basic building blocks and attributes discussed previously, ratemaking models that were able to accomplish this would be able to better meet the wide range of demands of regulators, insurance company management, and financial markets, and all in a consistent manner.

There is an important opportunity to be gained by doing so: to bridge the gap between the somewhat disjointed regulatory activities of ratemaking and solvency. Solvency is guarded by fair returns. It is imperative that the connection be made between rates, return, and the resultant growth in surplus that is necessary to maintain adequate solvency margins. This can be accomplished better if the models contain all elements of cost and value, and present results in a language that can be understood by all.

7. CONCLUSION

Insurance financial analysts of all disciplines can benefit from better understanding the finance perspective on value creation, especially as the financial marketplace converges and previous industry

boundaries blur. Practitioners that expand beyond more narrowly focused analytical methods, to a broader and more integrated company level of application, enhance their own value significantly. Understanding the key costs and contributors to value creation and how to measure and influence them is an essential part of this process.

In addition to understanding the value creation process, those who develop and apply analytical models can make them more complete and useful by incorporating the key building blocks suggested. Results need to be relevant and expressed in a language that management can understand. The breakdown of value creation into the key cost and value contributors presented spans the underwriting, investment and finance activities of the insurance company and the more specific operating activities embedded within each of them. This structure provides the capability to consistently measure the contributions of each activity to total company performance, and further to judge them by the same risk / return standards.

The cost of capital need not be viewed as beyond the scope of much of the financial analysis that occurs within an insurance company. The value formulation presented here provides the ability to integrate these costs more directly with the internal financials. Many financial activities can benefit from the use of this broader and more complete finance perspective, including ratemaking, risk analysis and capital allocation, since the decisions in these areas are ultimately all related to value creation in the whole.

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