Corporate Performance Measures: An Integrated Approach

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A. Challenges to the Insurance Industry in Japan

Insurance companies, life and general, in Japan are confronting some of the most serious challenges in history. These are the challenges to remain solvent and attain profitability. On the investment side, interest rates remain historically low, with depressed real estate value for the past decade, and poor equity performance over a ten year period. On the liability side, competition is in tense without significant growth in markets. Furthermore, the industry is facing more regulatory changes and requirements.

In this environment, insurance companies must take remedial actions. For example, we may seek higher yielding assets, often with higher risks. On the corporate level, we may seek additional capital infusion. We may focus more on the profitability of the products and not only on market shares. Life and general companies are different in their experiences; each company has its own unique challenges and responses. But, by and large, we must explore new approaches to succeed in this adverse environment.

In this paper, I propose a new approach. This approach is to implement an integrated corporate performance measure. The proposed solution is not a tactical method that seeks immediate, but often temporary, positive results. Nor is the solution that would seek relief from government agencies.

Today, there is a sense of urgency to introduce Value at Risk and other risk measures to monitor our financial health. Concurrently, new accounting initiatives are introduced to ensure further reporting transparency. These are positive developments. But are we ready for the challenges?

I think not. International banking risk measure standards are designed for transparency of the banking solvency and not for internal management of financial institutions. Value-at-Risk, Earning-at-Risk, Cash flow-, Liquidity-, and many other at-Risk measures are after all statistical measures of uncertainties of financial institutions' solvency. These measures can at best partially capture the risks and evaluate the performance of the financial institutions. Often they are not applicable for the internal management of an insurer. As an industry, if we do not improve our internal management, there is no externally imposed risk measures that can assist us to overcome the challenges.

I propose we must first recognize insurance companies are in the business of risk transform. A well design process has to be in placed to utilize investors' capital to transform risks from borrowers to lenders. Regional banks transform saving deposits to loans and mortgages. Commercial banks transform certificate of deposits to corporate loans. For us, life insurance companies transform life policies and annuities to capital market investments. General insurance companies transform property and casualty policies to capital markets. These transformations must be implemented by well design processes. To ignore the risks of these processes in managing the risk of a financial institution is as meaningless as to evaluating the Toyotas using all the standardized risk measures, ignoring the process of building a car.

Risk management of an insurance company should begin with evaluating the process of the risk transform and then measure the risk and performance of each phase of the process. Performance of an insurer should then be measured the performances of all the major departments of the process adjusted for their risks.

The new approach is to exploit the latest financial technologies that have experienced tremendous growth over the past twenty years and apply them to our industry. More specifically, I propose to use this technology to develop a set of accurate, relevant, consistent measures of performance of all the major departments. These measures should be able to hold each department accountable for their actions. And all their benchmarked actions will be consistent to a common firmwide objective. In so doing, insurers will be able to perform in a economically rational fashion. This is important because our industry is rapidly becoming more driven by global capital markets.

The purpose of this paper is to describe the proposed corporate performance measures. I will discuss how such a set of measures can be implemented, and why other performance measures used to date fail to fulfill our needs. In Section B, I will first describe the proposed general approach using process engineering as a framework. In Section C, I will describe the assumptions underlying the model of the business process of insurance. In Section D, I will describe the modeling of an insurer showing how financial technologies should be used for corporate management. In Section E, I will show why VaR may not be an appropriate measure of risk for insurer and will define Earning at Risk as a natural extension of VaR. Section F will then describe the performance measures of the major departments. Section G is the conclusion, suggesting what actions that we can take in light of the progress of recent research.

B. What are the Corporate Performance Measures?

The process for financial institutions focuses on the specification of roles and responsibilities to all the departments participating in transforming the financial risks. The precise design of the process of course should depend on the particular institutions' business mission, culture and other management issues. In general, the process should have four cycle phases: requirement, design, test and implementation phases.

Senior management is responsible for the requirement phase. They must specify the limits of the risk exposure and the expected returns of the shareholders' equity or the embedded value of the insurers given the supply and demand of funds in their market place. Asset and liability management is responsible for the design phase. They are responsible for the planning of the growth and structure of the balance sheets that would meet the requirements specified by senior management. The portfolio management of insurance companies is responsible for the test phase. In this phase, current market prices and liquidity are used to ensure that the target balance sheets and profitability can be realized and that the design is consistent with market reality. Finally, the line businesses and trading are responsible of implementations, where loans are made, deposits are collected and securities are traded. Performances are then reported to the senior management for the feedback control, and thus completing the process cycle. A more detail discussion of such a process is beyond the scope of this paper. Ho (1995, 1999) discusses this process in more detail.

The central function of process engineering is to design and specify in more detail the above mentioned process. Financial modeling is used to describe this process and this modeling provides the following performance measures:

- Identify the balance sheets and the income statements of all the phases
- Measure risk and performance of each phase against its benchmark
- Attribute the institutions' performances and risks to each phase of the process

In sum, this process approach provides an integrated framework of risk management to the institution. By way of comparison to using risk measures like value-at-risk, earning-at-risk, and others, the proposed approach of this article has three important attributes:

(1) Bottom up

The methodology ties information from the transaction level to the corporate goals, from trading decisions to corporate strategic decisions. In contrast, to date, there is no consistent framework to relate value-at – risk and other risk measures to the corporate goals and management actions.

(2) Process Oriented

The methodology focuses on the process of risk transform in the financial institution. To date, value-at-risk and other measures focuses on the risks of shareholders' equity and returns only. Without identifying the process within the institution, such risk measure fail to identify the sources of the risks.

(3) Consistency

The methodology ensures consistency of risk measures. In contrast, Value at Risk and other measures may not be consistent with each other. For example, Value at Risk is economic value based while Earning at Risk is book value based. They do not readily tie to a set of consistent corporate actions.

In comparing with GAAP accounting approach, this proposed methodology is forward looking, based on future stochastic cash flows, capturing future uncertainties in the measure. We use capital market observation to provide a systematic and consistent present value calculation. In contrast, GAAP accounting must be backward looking using deferred acquisition cost, amortization of good will and other accrual basis. Further, the measures of the risks tend to be rule based and not continually calibrated to the market realities.

Some insurers begin to use cash flow testing to enable the senior management to simulate future events. But we must note that cash flow testing, while a useful tool, is limited in its application. The method enables us to identify our future scenarios on a run off basis under our own, often, subjective set of assumptions. Since the results are somewhat removed from the process of internal management, the optimal solution to enhance the insurer's value is often less apparent.

C. The Assumptions of the Basic Model

This section will present the basic model of the business process for a life company. The model is also applicable to general insurance company. There are many possible extensions to this basic model. These extensions will be left for future research. The purpose of this paper is to propose the basic model that may capture the salient features of the corporate performance measures viewing financial services as a process.

We will make the following assumptions about the life insurer and the capital market:

1. Asset valuation
   We assume that the asset portfolio consists of only marketable securities. All assets are tradable and have market prices. This is a simplifying assumption enabling us to focus our discussion on the corporate measures without being distracted by complicated issues of valuing non-marketable securities.

2. Liability valuation
   We assume that the insurer sells guaranteed investment contracts (GIC). There is no other type of liabilities such as annuities, corporate short term and long term debts. For transfer pricing purposes, the GIC are discounted by the government bond rates to determine the internal economic value of the liability payments.

3. Organizational structure of the insurer
   The insurer has four departments: senior management, asset and liability management (ALM), portfolio management, and line business. The responsibilities of each department is given below:
   Senior management: for the operations of the insurer and setting the insurer's performance targets; Senior management would include the management committee that represents the stakeholders' interests.
   ALM: for determining the asset and liability structure Asset and liability management include also the risk management, for the purpose of this paper.
   Portfolio management: for investments. Investments includes asset allocation, sector rotation and securities evaluation and trading. For most insurers, portfolio management is separated into trading and other functions. The proposed methodology can be used for drilling down to such disaggregated levels.

Line business: for the sale of GICs These are term products with a single payment. This product is investment like and is used for this paper for simplicity without being distracted by mortality, morbidity and other product risks.

4. Insurer's objective function
The insurer's objective is to increase the shareholders' equity value or the embedded value. Also, this assumption is made to simplify the analysis and exposition. All insurers have to be concerned with regulatory solvency tests, financial reporting, and franchise value beyond the company's embedded value. The paper will show that the model can be extended to deal with these issues. Incorporating all the other objectives and constraints to the model, while important to the implementation, will add much complexity to the exposition of this paper.

5. Reporting Period
The model can be used in a multi-period context. For clarity of exposition, we will present the model as a one period model. The period is the reporting period which maybe one month or three month. The model will be used in a prospective basis when the model is used for risk management. At the same time we will also use the model in a retrospective basis when the model is used for performance measures.

While these assumptions are unrealistic for an insurer, I believe such simplifications will enable us to study the process of insurance more effectively.

D. Financial Modeling of the Life Company

We will present the model using the approach of the financial statements. As opposed to the financial statements of GAAP, these financial statements are determined on an economic valuation basis. To date, financial research enables us to report these economic-value based financial statements. This model provides a set of internally consistent measures, using a double entry approach, and the model captures the salient features of measuring risk and performance. Further, the model can depict the business process.

1. Balance sheet equation

$$S = A - L \tag{1}$$

S: the shareholders' equity or the surplus (or often called the embedded value)
A: asset market value, where assets are assumed to be only marketable securities
L: liability economic value, where the value is based on the run-off business. Similar to the cash flow testing methodology, we will use only the run-off business. The reason for this assumption of ignoring the future sales growth is that we can use "option" valuation approach. There is an extensive literature in the area of valuation of liabilities. The approach this paper proposes has been explained elsewhere, see Reitano (1997), Girard (1996) and more recently Grosen and Jorgensen (1999). One aspect of much discussion of the valuation of liabilities is the spread required in the discounting. This model assumes that the insurer establishes a transfer pricing methodology (see Wallace (1997) for a discussion of transfer pricing) and the model assumes no spread off this transfer pricing curve. In essence, we assume a gain-on-sale methodology. However, the model does not have to use the gain-on-sale method.

2. Income statement equation

$$y = pv + r_A A - r_L L - e - t \tag{2}$$

y: after tax income to the insurer on a total return basis. This income is not the realized income on the accounting basis. This income is the added value to the firms embedded value over the reporting period.

p: profit margin of the GIC, where the profit margin is defined as the expected proceed over the reporting period net of the economic value divided by the current economic value
v: the sale volume over the reporting period (a month or a quarter), measured by the economic value. Unlike the balance sheet equation (equation (1)) where the liability is considered only to be the run off business, for the income equation, we incorporate the growth of new sales. Therefore, the income equation brings in the franchise value of the insurer.
r_A: total return of the assets, where the realized and unrealized capital gain and all the cash flow received during the reported period are taken into account. Total return is a standard performance measure for many investment styles. This model seeks to maintain consistency of measures between asset management and liability management. Total return approach has been discussed in more detail in Ho, Scheitlin and Tam (1995). One important aspect that this paper incorporates is the sales growth model.
r_L: total return of the liabilities, where the liabilities are marked to market and the total return is the change in market value together with all the liability payouts during the reporting period. Payouts would include the benefits and the cash value withdrawal. For general insurance, the payouts will be the insurance payments. Note that the modeling is based on cash flows. Therefore when an incident occurs during the reporting period, the incident will increase the total return of the liability. The increase is the present value of the future insurance payments plus expenses, discounted by the transfer pricing curve. This approach does not make the distinction between earned and unearned premium. The model only concerns with the expected cash flows and current portfolio holdings. Premiums that have been received as inflows have no effect on the total returns of the liabilities.
e: the operating expenses for the period. This paper focuses on the financial theory of risk transform and not on the operational aspects of the insurance business. While expenses are central to the performance of an insurer, life or general, the model will assume that these expenses are certain and predictable, in order not to distract the purpose of the paper.
t: the tax payments for the period. Taxes are often based on accounting financial statements. Therefore the tax payments amount is not the product of the marginal tax rate and the income based on total returns. We assume that there is a tax model that derives the tax amount.

3. Retained earnings statement equation

$$\Delta S = y - d \qquad (3)$$

ΔS: the change of the surplus (embedded value)
d: the dividend payout. This model does not solve for the optimal dividend policy. We will assume a certain policy that the insurance company follow.

4. Sources of funds equation

$$\Delta L = r_L L + f \qquad (4)$$

f: net funding, where

$$f = b - l + v \qquad (5)$$

b: new borrowing, and this includes loan or bond issuance,
l: paydown of liabilities, benefit payments that leads to a fall in the market value of the liability by the same amount.
v: new volume sales

The increase of liability is viewed as a source of external funding. When the expected total return of the liability is high, the model interprets that the cost of funding is high. When the cost of insurance increases unexpectedly, the liability value increases. This is not interpreted as an increase in sources of funds but an unexpected increase in the cost of funding.

5. Uses of funds equation

$$\Delta A = r_A A + f + pv - e - div - t \qquad (6)$$

Uses of funds equation is the corresponding equation to the sources of funds on the asset side.

Note that this model ensures that the double entry approach is maintained. That is, the change of the surplus is the change of asset net the change of the liability value.

E. Value at Risk (VaR) and Earning at Risk (EaR)

Recently there is much discussion of VaR as a risk measure for the balance sheet of an insurer. In essence, VaR focuses on the balance sheet equation (equation (1)), measuring the surplus value risk However, such a risk measure has limited value for an insurer. This is because an insurer does not necessarily focus on the risks exposure over a short term. On the contrary, insurers should be concerned with the longer term, taking the sales, investment returns and other factors into consideration.

For this reason, we can use the income statement equation (equation (2)) to determine the EaR. The distribution of the income (y) given the parameters to the equation can determine the EaR. To date, EaR measures are determined by the accounting methods. Therefore, EaR and VaR are not comparable. In using equation (2) to determine EaR, we have extended the VaR measure to incorporate earnings to the risk measure.

F. Corporate Performance Measure

The model can be used on a retrospective basis for measuring performances of each department on the process of the insurance business.

This is accomplished by setting up asset benchmark returns (r_{A*}) and liability benchmark returns (r_{L*}). The benchmark returns are the returns of portfolios based on the average performance. For the assets, this is often accomplished by using some broad based market index, tilted to reflect the desired risk exposure of that asset and liability management view. Similarly, the liability benchmarks are determined by the liability modeling without assuming significant superior in knowledge and information of the line of business. The performance of the ALM department is measured the views that the ALM department takes and their views are reflected by the benchmarks that they establish for each reporting period. Specifically, we have:

$$y\,(ALM) = r_{A*}A - r_{L*}L \qquad (7)$$

Performance of the portfolio management is measured the expected return of the portfolio net the expected returns of the benchmark on the prospective basis. For return attribution, on the retrospective basis, the performance would be the realized returns of the assets net the realized returns of the liabilities. Specifically, we have:

$$y\,(PM) = r_A A - r_{A*}A \qquad (8)$$

Performance of the line business is measured the profits they generate from the new sales and their management of the liabilities in their performance against the benchmarks.

$$y\,(LB) = pv + r_{L*}L - r_L L \qquad (9)$$

Then we can now specify the corporate performance measure by noting that:

$$y = y\,(ALM) + y\,(PM) + y\,(LB) - e - t \qquad (10)$$

Senior management's role is to ensure that the income (y) will enhance shareholders' value by managing the process and ensuring the net income (y) meets the shareholders' expectations..

It is important to note that this paper proposes a set of performance measures. I do not suggest that management compensations should be directly related to these measures, though, these measures can be part of the inputs. This paper is also not proposing a management system dealing with the human resource issues. This paper focuses on the process engineering aspect of the risk transform and control for an insurer.

G. Conclusions

Process engineering is central to risk management for financial institutions as it is for manufacturing companies. Meeting international banking risk measurement standards enables us to satisfy solvency requirements, but it does not enable us to manage the risk and performance of our business. Process engineering offers a process design approach, bottom up analysis in a consistent framework.

This process engineering approach in determining corporate performance has immediate implications to actionable decisions. First, the method enables an insurer to measure economic performance in a more transparent fashion. This approach can assist insurer to secure external funding for risk capital.

Second, by incorporating future sales to the analysis, unlike cash flow testing method, we can better identify the insolvency scenarios. Our planning can be more realistic. Also, this model is calibrated to the market value to returns, and therefore the simulations will be less subjective then what will be accomplished by some cash flow testing

Third, by establishing a process, an insurer can better manage risks that cannot be hedged. By focusing on establishing the process of evaluating risks and controlling risk, the investment department can have a procedure to evaluate higher yielding investments.

In essence, to date, we should exploit quality control process for financial institutions to manage our capital in order to meet our current challenges in our industry. As our manufacturing companies used quality control in the sixties to compete globally, our financial industry should also adapt quality control to compete globally at the turn of the millenium.

Today, Japanese insurance industry maybe facing unprecedented challenges of dramatic changes. This may also be the opportunity for the insurance industry to rise up to the challenge as the manufacturing industry did several decades ago.

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