Implications of Dynamic Financial Analysis on Demutualization

Jan Lommele, FCAS, MAAA, FCA, and
Kevin Bingham, ACAS, MAAA

Introduction

Recent announcements such as the Prudential's plan to fully demutualize have brought the issue of demutualization to the forefront of the insurance industry. The Center for Insurance Research estimates that one in six households may be impacted by the demutualization of Prudential alone. A number of other mutuals have also discussed plans to demutualize or are currently in the process of demutualizing: John Hancock, Standard Life, General American Life, Pacific Life, Mercer Mutual, Metropolitan Life, Mutual Life, and Farmers Casualty Company Mutual, to list a few. UNUM, Equitable, Reliastar and Allmerica represent a few of the growing number of companies that have successfully demutualized over the last decade.

Based on A.M. Best's Aggregates and Averages as of December 31, 1996, 396 Property & Casualty (P&C) mutuals have over $205 billion in cash and invested assets, with an additional $25 billion in non-invested assets. They are currently holding loss and loss adjustment reserves of $93 billion and unearned premium reserves of $33 billion. Total consolidated policyholder surplus for the mutual companies reviewed by A.M. Best exceeds $82 billion dollars as of December 31, 1996 [1].

The aforementioned figures emphasize the importance of demutualization analyses for the P&C industry. Although most of the activity has occurred on the Life side, the P&C industry is now witnessing a similar increase in demutualization activity driven by the need to access additional capital. Not only are the amounts of dollars at stake staggering, demutualization also has a number of direct and indirect impacts:

- Direct impact on current policyholders' ownership rights;
- Direct impact on company management incentives and compensation (i.e. stock options);
- Direct impact on government legislation and statutes that control the authorization and regulation of P&C demutualizations;

- Direct impact on competitiveness of the insurance market and access to capital;
- Direct impact on the supply and demand of stock insurance companies listed on the NYSE and NASDAQ;
- Indirect impact on the market value of current stockholder owned companies as investment advisors reassess current market valuations based upon alternative investment options; and
- Indirect impact on the legislative agendas in other states that have yet to approve statutes and legislation governing demutualizations.

The authors currently use DFA to focus on four key target markets within the insurance industry:

1. Analysis of risk through future time horizons with implications on strategic planning, operations, investments and surplus allocation;
2. Actuarial appraisal of economic value for P&C insurance company demutualizations;
3. Review of an individual client's reinsurance program and opportunities for enhancing coverage in a more cost effective manner; and
4. Traditional reviews of cash flow and capital adequacy.

The purpose of this paper is to describe and explain how the new and evolving field of dynamic financial analysis (DFA) can be used in the assessment of P&C mutual insurance company demutualizations and the actuarial appraisal of economic value.

Demutualization Feasibility

Industry analysts and companies in the process of demutualizing who have posted information on their web sites say the number one answer to the question "why demutualize?" is

"access to capital". John Hancock's web site http://www.johnhancock.com answers the previous question by stating:

> *"The financial services marketplace has changed dramatically. Competition has become extreme and consolidation rapid. To compete successfully, mutual insurance companies across the country have recognized the need to access unprecedented amounts of capital to invest in new products, agency and other distribution channels, improved customer service and technology. In an industry that has seen tremendous consolidation recently, large amounts of capital are also needed to undertake strategic acquisitions or alliances to compete with new insurance providers as well as larger financial services firms which are taking shape today through consolidation."*

The Bowes Funds web site http://www.bowesfunds.com answers the question:

> *"Access to Capital. As a result of government deregulation, banks and insurance companies are now able to conduct business in expanded geographic areas and offer a broader range of product lines. To take advantage of this added flexibility, many of these companies need to raise additional capital to expand their operations and implement technological upgrades; however, mutually owned banking and insurance companies are limited in their access to capital by the size of their accounts. Converting to public ownership allows these companies to raise the capital they need through the sale of shares to accountholders and outside parties."*

The next logical question to ask is why mutual companies cannot raise capital under their current structure. The white paper draft titled Mutual Insurance Holding Company Reorganizations from the National Association of Insurance Commissioners (NAIC) lists four ways a mutual company can increase their capital base:

1. Through retention of net profits;
2. Issuance of surplus and capital notes;

3. Offering shares of stock in a downstream subsidiary, and

4. Merger.

Expansion into different geographic areas or entering new lines of business requires a large amount of initial capital investment. The above methods are not efficient alternatives for achieving growth, profitability and responding to market opportunities. Retention of net profits is largely driven by the current hardness or softness of insurance prices. A company's current line of business profitability depends upon the market prices underlying each book of business. Increasing profitability generally requires a combination of raising policyholder premiums, writing more profitable accounts, reducing losses, or reducing expenses such as agent commissions and acquisition expenses. Since companies are already heavily focused on minimizing costs and expenses and developing profitable books of business, obtaining the capital through current profits to finance new growth is difficult at best.

The issuance of surplus and capital notes has a number of drawbacks. The white paper draft from the NAIC lists a number of limitations for using surplus notes:

- A surplus note is a form of debt that must be repaid, therefore, no permanent capital is created;
- A number of states have imposed limits on the total amount of policyholders' surplus that can be derived from the issuance of surplus notes;
- Surplus notes, as a form of capital, carry a substantial cost in the form of debt service;
- Surplus notes require regulatory approval of all payments of principal and interest. This creates uncertainty for an investor, raising the cost of capital; and
- Insurance rating agencies typically count surplus notes as debt, i.e. a liability, rather than equity, in their evaluation of an insurance company's claims paying ability.

Capital notes have similar drawbacks to surplus notes as discussed above, except interest and principal repayments often do not require the approval of the insurance regulator.

Offering shares of stock in a downstream subsidiary has a number of operational and regulatory limitations, the most significant of which eliminates the use by the parent of the newly raised capital from the subsidiary stock offering. All capital raised must remain in the new stock subsidiary, resulting in no direct benefit to the parent company since capital cannot be reallocated where needed within the organization.

Mutual companies may also choose to merge with other mutual insurance companies. Unfortunately, merging with other mutual companies does not address the need for additional capital. Although reductions in duplicate staff and the consolidation of financial, marketing, operational, and other areas may reduce expenses, the merged company still must address the issue of increasing capital through retention of the combined entity's net profits.

Demutualization Process

The demutualization process requires a number of different phases in order to transform a mutual company into a stockholder owned company. A diagram of the five phases has been attached in Appendix A. The paper focuses on phases two through four but a brief description of phases one and five has been included below.

The first phase requires company management to decide whether or not they need to demutualize in order to access additional capital. Management's need for additional capital can be driven by a number of factors such as investment in and implementation of new technology, rapid growth of existing lines of business, expansion into new lines of business and strategic acquisitions or mergers. The insurance industry has seen tremendous consolidation with mega mergers like Citibank and Travelers as well as Berkshire Hathaway's proposed purchase of General Reinsurance. The aforementioned transactions as well as a host of other deals occurring throughout the P&C industry have increased competition across all lines of business. Mutual companies are now competing against enormous financial institutions with widening distribution channels through the use of banks and affinity relationships. An opportunity to level the playing

field for most mutual companies lies in the ability to access additional capital through the capital markets and the initial public offering process by choosing to demutualize.

The second phase requires the completion of a number of different tasks in order to perform the DFA analysis. The first task requires an in-depth review of historical company data and discussions with company management. The review focuses on all aspects of the balance sheet, the income statement and the cash flows generated by the company. A number of the key assumptions underlying the model such as expected loss ratios, investment returns, asset classes and expense ratios can be established at this time. The second task involves the mock-up and parameterization of the stochastic model. A thorough review of the underwriting module, payout module and investment module occur at this time as well as the customization of the model for any company specific assumptions. The third task requires a review of the model with the stochastic switch turned off. It is important to verify the expected results generated by the model for reasonability and consistency with historical results achieved by the company. The model outputs a number of operating ratios and leverage ratios that can be compared with the historical ratios produced by the company.

The third phase establishes the actuarial appraisal range of value by stochastically simulating company results for the future years. Each individual simulation is saved in the storage module for use in the confidence interval testing. The authors currently use a middle eighty percent confidence interval to establish the actuarial appraisal range of value for the mutual company under review. The appraisal value factors used in determining the actuarial appraisal range of value are derived using the ratio of the estimated company value simulated by the model to the company's actual December 31st surplus for the last historical year.

The fourth phase requires the acceptance of the results by management, the insurance department and the policyholders. This phase initially involves in-depth discussions between company management, legal representatives and the insurance department about the underlying assumptions and appraisal range determined by the model. It is important to communicate what the appraisal range of value does and does not cover. For example, the model does not estimate the purchase price that would be agreed upon between a potential buyer and seller. Items such as

the perceived value in the company's name brand recognition, agency distribution network, value of licenses, and goodwill are not explicitly included in the model's appraisal value. Although some of the items may be implicitly included in the appraisal value, they may require a subjective analysis by company management in order to determine the final compensation value that will represent the policyholders' ownership interest in the company.

The fairness of the final compensation value determined by management and adopted by the Board of Directors is discussed at a public hearing called by the Commissioner of Insurance from the company's state of domicile. The purpose of the public hearing is to review the policyholder notice issued by the mutual company and to discuss any issues that arise about the determination of the final compensation value. The key goal of the public hearing is to determine whether the mutual company's plan for converting to a stock company is fair and equitable to the policyholders.

The fifth phase deals with the company's next steps after completing the demutualization and becoming a stock insurance company. As the company acquires additional capital and begins entering into new lines of business, growing existing lines of business, acquiring companies, or merging, it is important to analyze the proper allocation of surplus to the investments opportunities that will generate the highest returns with the lowest amount of risk. This type of analysis requires a more sophisticated DFA model addressing issues such as analysis of reinsurance on a contract by contract basis using a frequency-severity based approach, implementation of management intervention steps (e.g. reserve strengthening and portfolio rebalancing), and impacts on the company's ratings.

Demutualization Methodology

The authors determine an actuarial appraisal range of value based upon the application of a DFA model which estimates future statutory income, cash flow, and dividends to policyholders (or capital contributions) with supporting balance sheets, income statements and cash flow statements. The dividends determined by the DFA model represent payments from statutory earnings that could be made, subject to constraints in assumed leverage based on maintaining either a net liability to surplus ratio or a net written premium to surplus ratio. If earnings are not

sufficient to allow a dividend payment, the DFA model provides for a capital contribution. The actuarial appraisal value for current policyholders is estimated by taking the present value of estimated future policyholder dividends (or capital contributions), plus the remaining surplus at the end of the simulation period, discounted at the opportunity cost of capital (OCC). The actuarial appraisal value can be adjusted for two additional items, including the tax implications associated with the adjustments:

1. Inadequacy or redundancy in the stated reserves; and

2. Adjustment of assets to their fair market value.

The DFA model utilizing the above methodology was actually developed using a more complex DFA model which was developed by the authors' firm for individual insurance company strategic planning, management review and intervention, and surplus allocation. Some of the features of the larger model such as surplus allocation by business unit or line of business, investment portfolio turnover and rebalancing, management review and intervention, and the development of reinsurance on a contract-by-contract basis, are not needed for the estimation of a mutual company's actuarial appraisal of economic value. The authors nicknamed the DFA model "DFA-Light" due to its ease of use and manageable size. The simplified DFA model has a number of advantages:

- The model is very customizable and easy to use since it is in spreadsheet form;
- Mutual company annual statement data is readily available and easy to load into the model;
- The model is easier to parameterize than the larger DFA model;
- The key assumptions underlying the model and the simulation results and graphical output are easy to explain; and
- The analysis can be completed in a relatively short period of time, as compared to the time required by the more sophisticated, larger model.

Appendix B displays a flow chart of the model.

Conceptual Framework

To understand the conceptual framework behind the establishment of the actuarial appraisal range of value and the determination of the OCC, we have decided to take a step back and provide a simplified example. The example below will help to explain some of the more counterintuitive results that can be derived using the DFA model.

Suppose an investor has $747.26 to invest. The investor is presented with two investment options:

1. Purchase a risk-free five year zero coupon bond, with a 6.0% yield; or
2. Invest in XYZ Casualty Mutual.

XYZ Casualty Mutual's premiums are written and earned on 12/31/XX, losses are incurred and paid on 12/31/XX, the company pays no taxes or investment expenses, invests in one year bonds with a 6.0% coupon, and writes business at a 1:1 premium to beginning surplus ratio. However, insurance results are uncertain and likely to vary from the expected level. For purposes of this example XYZ Casualty Mutual is assumed to have a 30% probability of running a 100.0% combined ratio (CR) (see Appendix C.1), a 19% probability of running a 90.0% CR (see Appendix C.2), and a 51% probability of running a 105.0% CR (see Appendix C.3).

If the investor chooses the first option, the $747.26 investment grows with certainty to $1000.00 ($747.26 x $(1.06)^5$) at the end of five years. If the investor chooses the second option, the expected return is the same $1000.00 at the end of five years based upon the probabilities specified above (see Table 1). Although the investor expects to earn 6.0% annually, the investor has a 51% chance of earning 1.0%, a 30% chance of earning 6.0%, with only a 19% probability of earning in excess of the 6.0% return at 16.0%.

In order for the investor to choose the second option, the investor must be compensated for assuming the additional risk by receiving a higher return on his/her investment. This higher return is the investor's OCC. The OCC is itself dependent on the investor's expectations of future interest rates, inflation, the risk represented by the volatility of earnings in the insurance

business and the perceived prospective returns from alternative investment options available to the investor.

Assuming other insurance companies writing similar lines of business return 10.0% to their owners, the investor could set his/her OCC at 10.0%. The 4.0% return above the 6.0% risk free rate represents the investor's perceived cost of assuming the additional underwriting risk. Table 1 summarizes the results:

Table 1

	Probability	Initial Investment/ Beginning Surplus	12/31/02 Return	Annual Percent Return	OCC	OCC Adjusted Return	Ratio to Initial Investment
OPTION 1							
Zero Coupon Bond	100%	747.26	1000.00	6.0%	6.0%	747.26	1.000
OPTION 2							
XYZ Mutual	100%	747.26	1000.00	6.0%	10.0%	620.92	0.831
CR - 100.0%	30%		1,000.00	6.0%		620.92	
CR - 90.0%	19%		1,569.50	16.0%		974.53	
CR - 105.0%	51%		785.38	1.0%		487.66	

Using risk adjusted returns, the investor can now see that investing in the zero coupon bond and investing in XYZ Mutual with an expected $1000 return is not equivalent. The investor could have taken the $747.26 and invested in a higher yielding corporate bond or invested in another insurance company which offered higher returns commensurate with the amount of risk taken on by the investor.

The above example helps to demonstrate how the company's growth from the current surplus level can actually be eroded over a number of years when compared to the risk-free investment. If XYZ Mutual's investment strategies are below average or the company runs combined ratios in excess of industry norms, the company will continue to increase surplus, but at a rate well below the desired OCC. This helps to explain why a portion of the actuarial appraisal range is below the beginning surplus for some of our demutualization analyses. Even a company with sound investment strategies and competitive combined ratios can produce results

below the starting surplus when the stochastic simulation produces larger losses than normal or poorer investment returns than expected for some of the individual simulations.

Parameterization

Parameterization of the DFA model requires extensive initial discussions with the company's management and a review of their statutory annual statements for the last three to five years. The report underlying the statement of actuarial opinion and a review of the auditor's independent report help in reviewing the actual historical results of the company for use in model simulation.

As discussed previously in the section titled **Demutualization Process**, the second phase involves a thorough review of the data requirements for the underwriting module, payout module and investment module. Although historical company data derived from internal company reports, the statutory annual statement and other workpapers are extremely valuable, these data sources are inadequate to fully parameterize the model on a stand alone basis. A variety of external data sources can be used to assist in the evaluation of the company's data in order to parameterize the model.

The parameterization of the investment module involves the determination of expected returns, variation and correlation by asset class. Depending on the complexity of the mutual company's investment strategy, internal historical data may be inadequate to properly parameterize the model. A valuable external source for key U.S. asset class data is Ibbotson's "Stocks, Bonds, Bills, and Inflation Yearbook" which provides total returns and index values for stocks, long-term bonds, long and intermediate term government bonds and treasury bills. The necessary items can be loaded into the model based upon the asset class allocation of the mutual company under review. As with all assumptions utilized in the model, the simulated before-tax portfolio yield must be compared with historical company results in order to verify the reasonability of the selected asset class parameters.

The parameterization of the payout module involves the estimation of line of business payout patterns and the loading of tax specific information under §846 of the Internal Revenue

Code. The selection of the line of business payout patterns is largely dependent upon the amount of available company data. In situations where the company's historical data lacks the credibility to sufficiently estimate a reasonable payout pattern for a line of business, industry data can be credibility weighted with the company's data in order to select the appropriate payout pattern. A number of industry sources exist for reference such as Sheshunoff's loss reserve development patterns for primary and reinsurance companies, Reinsurance Association of America's (RAA) loss development factors, and A.M. Bests Aggregates & Averages Property-Casualty review.

It is important to note that the size of the DFA model is largely dependent upon the number of lines of business written by the company and how investible assets are allocated in the company's portfolio between taxable bonds, tax-exempt bonds, stocks and other available asset classes. A number of other items can impact the size of the model but to a much smaller extent. Other income items such as finance and service charges from installment plans, treatment of non-investible assets, smaller scale liability items, and the handling of deferred compensation benefits and post-retirement health benefits can increase the model's size. As one would expect, the larger the mutual company, the more complicated the analysis becomes. The initial discussions with management and financial documents discussed above help to set the framework for the final layout of the DFA model.

Key Assumptions

Two of the key assumptions to determine the actuarial appraisal range of value in the authors' DFA model are:

1. Leverage Ratio
2. Renewal Retention Ratio (RRR)

The DFA model allows the user to select either a net liability to surplus ratio or a net written premium to surplus ratio to control the indicated dividends required from the policyholder. To the extent that net earnings in future years are not sufficient to maintain the selected leverage ratio, a capital contribution is indicated. Otherwise, a dividend to policyholders is reflected to bring the ratio to the selected leverage ratio. The leverage ratios can be derived

from industry comparisons with companies writing similar lines of business or based on an individual state's regulatory requirements. Selection of the appropriate leverage ratio should reflect many risk factors including uncertainty in underwriting financial results, cash flows and investment returns.

A leverage ratio is applied to maintain a uniform risk profile over the simulation period. Essentially, dividend and capital contributions are controlled in such a way as to maintain a balance between the insurance liabilities and the capital supporting them. In this process, consideration is given to factors that impact both liabilities and surplus, including those reported under conventional accounting and the economic adjustments mentioned previously.

The RRR represents the percentage of policyholders that renew each year and is easily derived from historical company data. Our model applies the RRR to the company's in-force business, resulting in a run-off of the current policyholders net written premium over the ten year simulation period. The method can be classified as a "run-off" approach since we do not consider the value of future business that could be generated by the company. The "run-off" approach was selected over an approach that also considers the value of future business generation due to the policyholder's unique ownership interest in a mutual company. Unlike a stock insurance company where the owners' value (shares outstanding) is fixed regardless of the growth in the number of policyholders, a mutual insurance company owners' value is diluted as the number of policyholders grows, since each additional policyholder becomes an owner of the company. Using the RRR "run-off" approach provides an estimate of the actuarial appraisal value without diluting the current policyholders' ownership interest.

Losses and Reinsurance

The authors have used two approaches when modeling losses and reinsurance:

1. Net ultimate expected loss ratio (ELR) approach
2. Frequency and severity (FS) approach and the modeling of reinsurance on a contract-by-contract basis

We currently use an ELR approach for the estimation of ultimate loss and allocated loss adjustment expense (ALAE) by accident year. The ELR can be compiled directly from historical company results since the actuarial report and internal company reports often provide ten or more years of net ultimate loss ratios by line of business. The mean and the standard deviation can be determined explicitly for each line of business. Table 2 shows an example of how to calculate the mean and standard deviation using XYZ Mutual's ultimate accident year loss ratios for the last nine years. The expected loss ratio and the standard deviation were calculated using mathematical functions standard in most spreadsheet packages.

Table 2

XYZ Mutual

Accident Year	Ultimate LR
1989	75.0%
1990	73.0%
1991	70.0%
1992	78.0%
1993	80.0%
1994	75.0%
1995	68.0%
1996	75.0%
1997	81.0%
Mean:	75.0%
SD:	4.3%

Historical Net Loss Ratios (LR)

Distribution Comparison

	Standard Deviation (SD)			
Probability	1.0%	4.3%	10.0%	15.0%
0.01	72.7%	65.0%	51.7%	40.1%
0.05	73.4%	67.9%	58.6%	50.3%
0.15	74.0%	70.5%	64.6%	59.5%
0.25	74.3%	72.1%	68.3%	64.9%
0.35	74.6%	73.3%	71.1%	69.2%
0.50	75.0%	75.0%	75.0%	75.0%
0.65	75.4%	76.7%	78.9%	80.8%
0.75	75.7%	77.9%	81.7%	85.1%
0.95	76.6%	82.1%	91.4%	99.7%
0.99	77.3%	85.0%	98.3%	109.9%

XYZ Mutual's explicitly calculated standard deviation is 4.3%. For comparison purposes, four possible normal distributions have been provided using a mean loss ratio of 75.0% and standard deviations of 1.0%, 4.3%, 10.0% and 15.0% (see Appendix D for graphical display). For a standard deviation of 4.3%, the stochastically simulated loss ratios will be less than or equal to 77.9% three quarters of the time. Alternatively, the DFA model could use a skewed distribution depending on the line of business.

Lines with the possibility of catastrophes can be modeled using a split point ELR. An analysis can be performed using catastrophe modeling to estimate the probability of a catastrophe occurring (i.e. 1 in every 100 years). Based upon industry analysis, catastrophe modeling, and

historical company catastrophe experience, the appropriate catastrophe ELR can be loaded into the DFA model along with the non-catastrophe ELR. The DFA model then stochastically simulates the line of business ELR by accident year based upon the catastrophe occurrence probability.

The ELR approach has a number of benefits over the FS approach:

- The ELR approach is much easier to understand and explain to insurance regulators and policyholders. As stated above, it is based directly on company provided data.
- The FS method requires the estimation of exposures which is sometimes difficult to obtain (e.g. General Liability, may use sales, square footage, or payroll) and the estimation of severity based upon a lognormal distribution or some other distribution which may not seem intuitive to the non-insurance reviewer.
- The ELR approach is easier to parameterize since estimates of the ELR and standard deviation are simple to derive. The FS approach requires more actuarial rigor.
- The ELR approach doesn't require the loading of reinsurance information on a contract by contract basis.

Accident year ultimate losses and ALAE are developed into calendar year using the payout pattern for each line of business. Payout patterns can be determined using internal company reports along with the external sources discussed previously. Unallocated loss adjustment expense (ULAE) can be calculated separately or loaded into the expected loss and ALAE ratio.

Invested Assets

The before-tax portfolio yield of the invested assets can be determined directly from the annual statement. The allocation of the invested assets to individual asset classes is important for tax considerations and requires a minimum of three asset classes: taxable investments, tax-exempt bonds and dividend-generating assets. Tax-exempt bonds and dividend-generating assets are used in the calculation of income taxes due to the removal of tax-exempt income, the dividends received deduction (DRD), and the subsequent tax proration of both items.

The model can be expanded to cover any number of different asset classes depending upon the investment strategy of the mutual company under review. The approach used by the authors combines expected returns, variation and correlation. For any given asset class, these three items must be defined in order to generate the outcome of events.

An important consideration for any appraisal range of value is the direction of future interest rates. Rising interest rates for a company that holds a majority of its invested assets in longer term bonds can be rather devastating if assets need to be sold in order to satisfy policyholder demands or the payment of dividends. Under the current interest rate environment where thirty year government bonds are hovering at yields of roughly 5%, a significant potential future risk lies in an upside swing in interest rates. The authors' DFA model can be run assuming a steady interest rate environment for the future simulation years, a falling then rising interest rate environment, or rising then falling interest rate environment. Our discussions with company management and insurance regulators point out that assuming a steady interest rate environment under the current interest rate conditions may result in a slight overstatement of the appraisal range of value depending upon how well the company has matched their assets and liabilities. Rising interest rates and the selling of bonds that are not held to maturity can result in capital losses, since the market value of bonds at the time of sale decrease from the amortized cost values shown on the annual statement. A company with an asset duration exceeding its liability duration by a large margin may require an explicit calculation of the possible capital losses under a rising interest rate scenario.

Non-Invested Assets

The DFA model can be programmed to handle non-invested assets in a number of different ways depending upon the size of the various non-invested assets. Agents' balances or uncollected premiums usually represent the largest non-invested asset on most balance sheets[2]. Agents balances flow through to the cash flow statement based upon the percentage of written premiums collected each year. The use of alternative assumptions to run-off the other assets usually has a minimal impact on the results of the demutualization analysis due to the small percentage of assets that are classified as non-invested assets when compared to the total balance sheet assets. A more detailed approach would be to develop collection/recovery patterns for other categories such as reinsurance recoverable on loss and LAE payments and federal income tax recoverable. For some of the smaller categories such as electronic data processing equipment and interest, dividends and real estate income due and accrued, the value added by individual estimation would be minimal.

Other Liabilities (excluding benefit accruals)

Similar to non-invested assets, the DFA model can be programmed to handle other liabilities in a number of different ways. Other liabilities exclude losses, LAE and unearned premium reserves, the three largest liability categories, and represent a small percentage of the total balance sheet liabilities. Other liabilities can be lumped together and treated like a single unpaid expense, similar to the treatment discussed above for non-invested assets and agents' balances. The assumptions used to run off the other liabilities usually has a minimal impact on the results of the demutualization analysis due to the small percentage of liabilities classified as other liabities. The excess of statutory reserves over statement reserves can be explicitly calculated and reflected as appropriate in the balance sheet liability and the surplus account.

Benefit Accruals

A simplifying assumption is to freeze the deferred compensation and post-retirement health benefit accruals at the December 31st value for the last historical year. A separate analysis

of the materiality of the accrual may be required if there is a perception that the held accrual may be inadequate.

Other Income

Other income items such as finance and service charges not included in premiums and servicing carrier revenue can result in an increase in net income. It is important not to forget such cash flow items in the demutualization analysis. The authors recommend two ways of handling other income items; the first approach would allow for an explicit calculation of other income items as a percentage of net written premiums, the second approach would reduce the line of business expense ratios for any additional other income items.

Taxes

The provision for Federal Income Tax utilized in the DFA model reflects only taxes attributable to operations without any consideration of the effect of a sale of the business. Current federal corporate tax rates have been assumed throughout the ten year simulation period. The DFA model considers regular tax versus alternative minimum tax, including loss reserve discounting, revenue offset, tax-exempt income adjustments and the DRD, including proration. For the purpose of discounting loss reserves for federal tax, IRS discount factors or company payout patterns can be used in the model.

DFA Model Sample Analysis

Presented below is simplified illustration of an actual actuarial appraisal of economic value performed by the authors.

XYZ Casualty Mutual writes personal automobile insurance for the automobile liability (AL) and physical damage (PD) lines of business. XYZ currently has $4.3 million dollars of surplus as of December 31, 1998 and invests primarily in taxable bonds. A review of the historical loss and LAE ratios for XYZ indicated an expected loss ratio of 78.0% for AL and an expected loss and LAE ratio of 70% for PD. The standard deviation for both lines of business were selected at 5.0% based upon a review of XYZ's internal company reports and the Statement

of Actuarial Opinion. Accident year ultimate loss and LAE ratios were simulated assuming a normal distribution and developed into calendar year cash flows using the below cumulative payout patterns by line of business:

	Age in Months							
	12	24	36	48	60	72	84	96
AL	0.400	0.700	0.850	0.900	0.970	0.980	0.990	0.995
PD	0.850	0.950	0.990	1.000	1.000	1.000	1.000	1.000

A number of simplifying assumptions were made to the DFA model for purpose of this example. AL and PD expenses where set equal to 28.0% in the model to reflect commissions, taxes, licensees, and fees, other acquisition expense and general expenses. Other income items such as finance and service charges from installment plans were assumed to be negligible. A majority of XYZ's taxable investments were placed in bonds, resulting in a yield on average assets over the simulation period of roughly 8% before taxes. Investments originally allocated to tax-exempt bonds and dividend generating assets by XYZ were reallocated to taxable bonds in order to avoid adjustments to tax-exempt income and the DRD.

A RRR or 87.5% was selected based upon XYZ's historical lapse ratio of 12.5%. A net liability to surplus ratio (NLSR) of 2:1 was selected to control the dividends (or capital contributions) made to the policyholder based upon a review of companies writing similar lines of business. Although a slightly lower ratio of 1.5:1 was indicated by the review of the other companies, the authors judgmentally selected a higher 2:1 ratio. Industry NLSR ratios have been lower in recent years due to the above average stock market returns over the last few years, resulting in an "overstated" surplus in the denominator. The selected 2:1 ratio, more reflective of longer term trends, maintains a balance between the insurance liabilities and the capital supporting them without unduly restricting the release of investor capital in the form of policyholder dividends.

Appendix E.2 and E.3 display XYZ's simplified balance sheet, income statement, cash flow statement, operating and leverage ratios, and the OCC analysis used to derive the actuarial

appraisal value factors. It is important to note that the results displayed in these two appendices represent one simulation with no variability in the loss ratios, investment returns or written premiums. Appendix E.3 shows the net surplus flows to the policyholders based upon maintaining the selected 2:1 NLSR. The 1999 simulation year actually required a capital contribution of $100,971 by the policyholders in order to raise surplus to $5,071,240, resulting in the 2:1 ratio when compared to the loss & LAE reserves of $10,142,480. Simulation years 2000 and subsequent provide the payment of dividends to the policyholders.

The cumulative internal rate of return (IRR) of 15.3% is shown on Appendix E.3 under the title Operating Ratios. The IRR was derived using the December 31, 1998 surplus of $4,298,679 as the policyholders' initial investment, the net surplus flows derived from the model, and a return of the remaining surplus (i.e. remaining initial investment) at December 31, 2008 of $1,881,094. The 15.3% IRR can be used as a benchmark for analyzing the OCC desired by investors in XYZ Mutual. If the IRR is greater than the OCC, the appraisal value factor will exceed one. If the IRR is less than the OCC, the appraisal value factor will fall below one. Reviewing the OCC analysis shown on Appendix E.3, the resulting appraisal value factors (ratios to surplus) for the 10.0% (1.301), 12.5% (1.146) and 15.0% (1.016) OCC are all greater than 1.000, reflecting the fact that the IRR is greater than all three OCC's. The appraisal value factors (ratios to surplus) were derived using the ratio of the estimated company value simulated by the model to the company's actual December 31, 1998 surplus. The estimated company value for current policyholders was determined by taking the present value of estimated future policyholder dividends (or capital contributions), plus the remaining surplus at the end of ten years, discounted at the appropriate OCC.

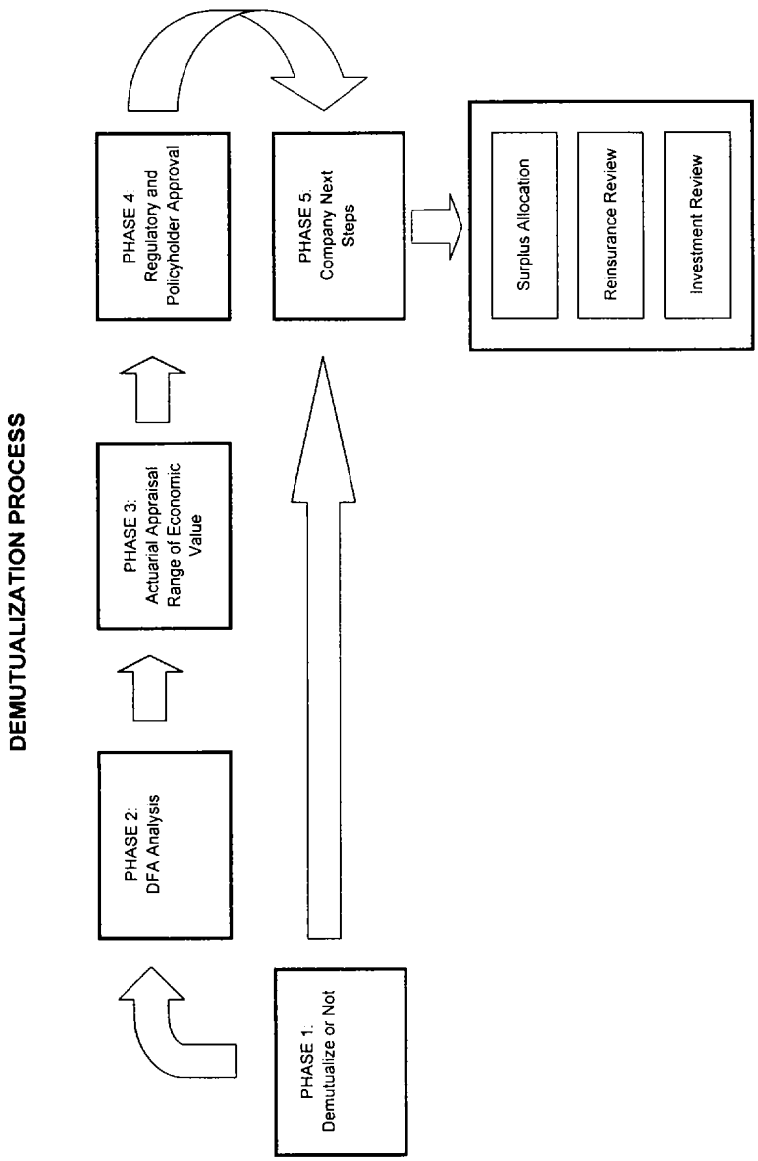
Appendix E.4 displays a scatter graph of the results from running the DFA model one thousand times with the stochastic switch turned on. With a 12.5% OCC, the appraisal value factors range from a low of 0.72 to a high of 1.56, with an average appraisal value factor of 1.15 for the one thousand simulations. Appendix E.5 displays a frequency graph of the one thousand simulations, along with the eighty percent middle confidence interval. The appraisal factors based upon the eighty percent confidence interval range from a low of 1.00 to a high of 1.34, with an average appraisal value factor of 1.17.

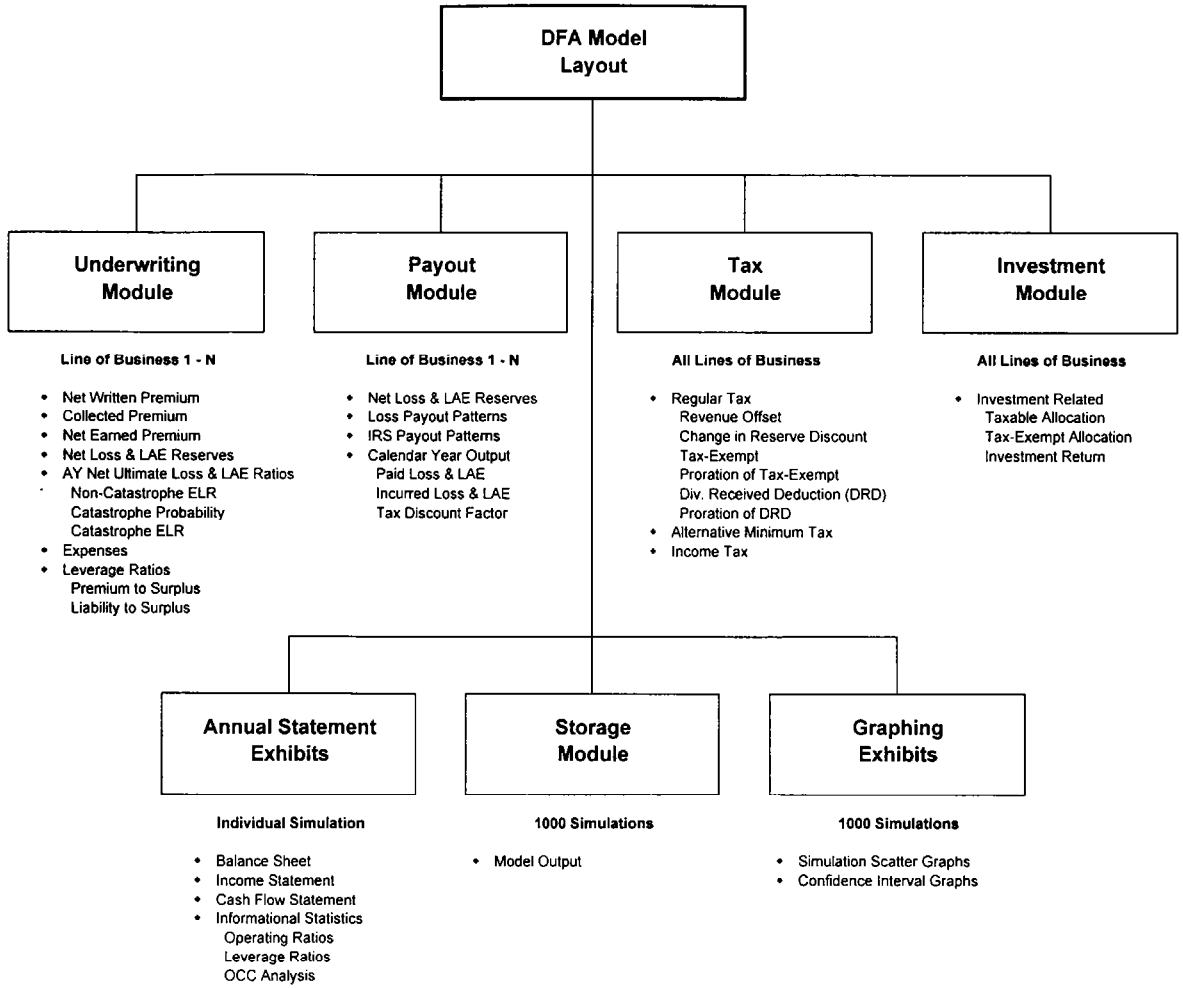
The results shown in Appendix E.1 document the actuarial appraisal range of value for three different OCC's: 10.0%, 12.5% and 15.0%. Using an OCC of 12.5%, the company has an economic value between $4.3 million dollars and $5.8 million dollars. The low end of the range offers the policyholders the actual stated surplus as of December 31, 1997. The high end of the range offers the policyholders $1.5 million dollars more than the actual stated surplus as of December 31, 1998. As one would expect, selecting the 15.0% OCC results in a lowering of the economic value of the company and selecting the 10.0% OCC results in a raising of the economic value of the company.

References

[1] A.M. Best Company, Inc., *Best's Aggregates & Averages*, United States Property-Casualty, 1997 Edition.

[2] Insurance Accounting and Systems Associations, *Property-Casualty Insurance Accounting* (Sixth Edition), 1994


DEMUTUALIZATION PROCESS
PHASE 1:
Demutualize or Not
PHASE 2:
DFA Analysis
PHASE 3:
Actuarial Appraisal
Range of Economic
Value
PHASE 4
Regulatory and
Policyholder Approval
PHASE 5.
Company Next
Steps
Surplus Allocation
Reinsurance Review
Investment Review


DFA Model Layout
Underwriting Module
Payout Module
Tax Module
Investment Module
Line of Business 1 - N
• Net Written Premium
• Collected Premium
• Net Earned Premium
• Net Loss & LAE Reserves
• AY Net Ultimate Loss & LAE Ratios
Non-Catastrophe ELR
Catastrophe Probability
Catastrophe ELR
• Expenses
• Leverage Ratios
Premium to Surplus
Liability to Surplus
Line of Business 1 - N
• Net Loss & LAE Reserves
• Loss Payout Patterns
• IRS Payout Patterns
• Calendar Year Output
Paid Loss & LAE
Incurred Loss & LAE
Tax Discount Factor
All Lines of Business
• Regular Tax
Revenue Offset
Change in Reserve Discount
Tax-Exempt
Proration of Tax-Exempt
Div. Received Deduction (DRD)
Proration of DRD
• Alternative Minimum Tax
• Income Tax
All Lines of Business
• Investment Related
Taxable Allocation
Tax-Exempt Allocation
Investment Return
Annual Statement Exhibits
Storage Module
Graphing Exhibits
Individual Simulation
• Balance Sheet
• Income Statement
• Cash Flow Statement
• Informational Statistics
Operating Ratios
Leverage Ratios
OCC Analysis
1000 Simulations
• Model Output
1000 Simulations
• Simulation Scatter Graphs
• Confidence Interval Graphs

XYZ CASUALTY COMPANY MUTUAL
100.0% COMBINED RATIO

		ANNUAL STATEMENT				
	1/1/98	12/31/98	12/31/99	12/31/00	12/31/01	12/31/02
BALANCE SHEET						
ASSETS						
BONDS	747	792	840	890	943	1,000
LIABITIES						
LOSS RESERVE	0	0	0	0	0	0
SURPLUS	747	792	840	890	943	1,000
INCOME STATEMENT						
PREMIUMS EARNED		747	792	840	890	943
LOSSES INCURRED		523	554	588	623	660
OTHER UNDERWRITING EXPENSE		224	238	252	267	283
NET UNDERWRITING GAIN OR (LOSS)		0	0	0	0	0
NET INVESTMENT GAIN OR (LOSS)		45	48	50	53	57
NET INCOME		45	48	50	53	57
SURPLUS PRIOR YEAR		747	792	840	890	943
NET INCOME		45	48	50	53	57
SURPLUS YEAR END		792	840	890	943	1,000
COMBINED RATIO		100.0%	100.0%	100.0%	100.0%	100.0%
ANNUAL RETURN		6.0%	6.0%	6.0%	6.0%	6.0%

12/31/02 SURPLUS:	1,000
12/31/02 SURPLUS DISCOUNTED @OCC:	621
BEGINNING SURPLUS (INITIAL INVESTMENT):	747
RATIO OF DISCOUNTED SURPLUS TO INITIAL SURPLUS:	0.831

NOTE:

ASSUMES PREMIUM AND LOSSES OCCUR ON 12/31/XX
ASSUMES A 1:1 PREMIUM TO SURPLUS RATIO AT THE BEGINNING OF THE YEAR
ASSUMES AN EXPECTED LOSS RATIO OF 70.0%
ASSUMES AN OTHER UNDERWRITING EXPENSE RATIO OF 30.0%
ASSUMES AN ANNUAL BOND RETURN OF 6.0%
ASSUMES NO TAXES OR INVESTMENT RELATED EXPENSES
ASSUMES SURPLUS RETURNED AT END OF YEAR 5
ASSUMES OPPORTUNITY COST OF CAPITAL (OCC) OF 10.0%

XYZ CASUALTY COMPANY MUTUAL
90.0% COMBINED RATIO

		ANNUAL STATEMENT				
	1/1/98	12/31/98	12/31/99	12/31/00	12/31/01	12/31/02
BALANCE SHEET						
ASSETS						
BONDS	747	867	1,006	1,166	1,353	1,569
LIABITIES						
LOSS RESERVE	0	0	0	0	0	0
SURPLUS	747	867	1,006	1,166	1,353	1,569
INCOME STATEMENT						
PREMIUMS EARNED		747	867	1,006	1,166	1,353
LOSSES INCURRED		448	520	603	700	812
OTHER UNDERWRITING EXPENSE		224	260	302	350	406
NET UNDERWRITING GAIN OR (LOSS)		75	87	101	117	135
NET INVESTMENT GAIN OR (LOSS)		45	52	60	70	81
NET INCOME		120	139	161	187	216
SURPLUS PRIOR YEAR		747	867	1,006	1,166	1,353
NET INCOME		120	139	161	187	216
SURPLUS YEAR END		867	1,006	1,166	1,353	1,569
COMBINED RATIO		90.0%	90.0%	90.0%	90.0%	90.0%
ANNUAL RETURN		16.0%	16.0%	16.0%	16.0%	16.0%

12/31/02 SURPLUS:	1,569
12/31/02 SURPLUS DISCOUNTED @OCC:	975
BEGINNING SURPLUS (INITIAL INVESTMENT):	747
RATIO OF DISCOUNTED SURPLUS TO INITIAL SURPLUS:	1.304

NOTE:

ASSUMES PREMIUM AND LOSSES OCCUR ON 12/31/XX
ASSUMES A 1:1 PREMIUM TO SURPLUS RATIO AT THE BEGINNING OF THE YEAR
ASSUMES AN EXPECTED LOSS RATIO OF 60.0%
ASSUMES AN OTHER UNDERWRITING EXPENSE RATIO OF 30.0%
ASSUMES AN ANNUAL BOND RETURN OF 6.0%
ASSUMES NO TAXES OR INVESTMENT RELATED EXPENSES
ASSUMES SURPLUS RETURNED AT END OF YEAR 5
ASSUMES OPPORTUNITY COST OF CAPITAL (OCC) OF 10.0%

XYZ CASUALTY COMPANY MUTUAL
105.0% COMBINED RATIO

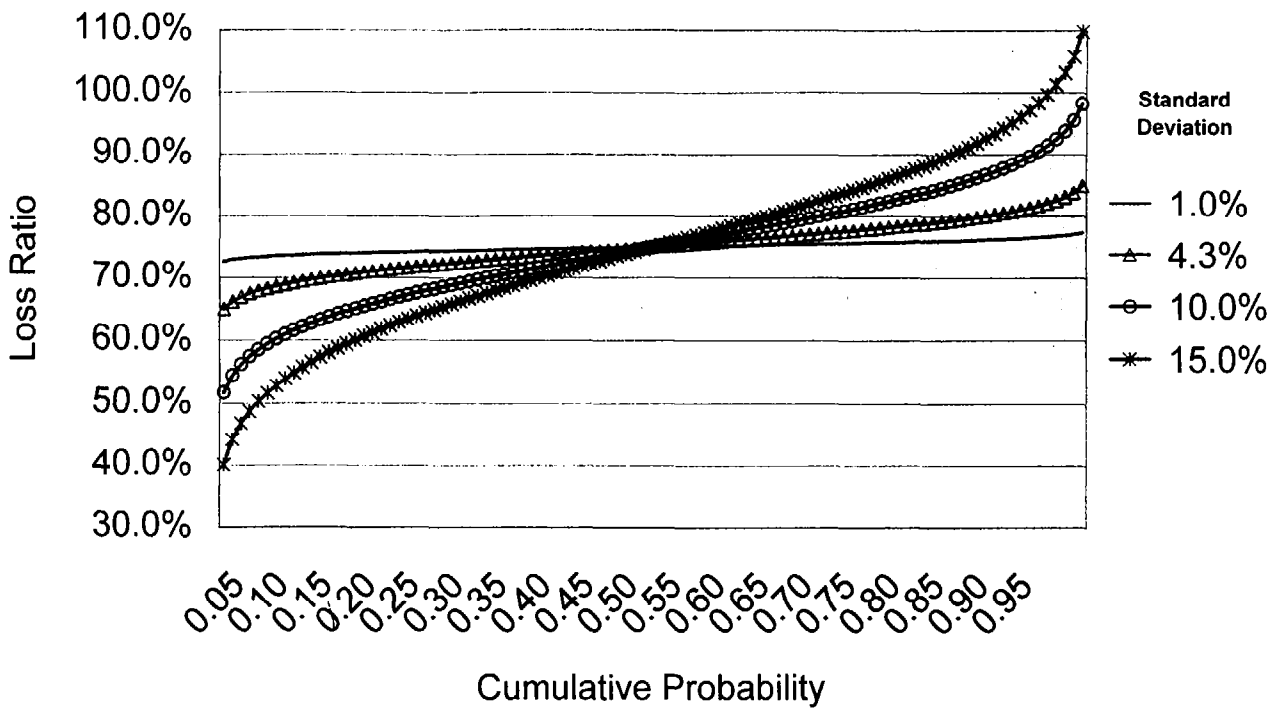
		ANNUAL STATEMENT				
	1/1/98	12/31/98	12/31/99	12/31/00	12/31/01	12/31/02
BALANCE SHEET						
ASSETS						
BONDS	747	755	762	770	778	785
LIABILITIES						
LOSS RESERVE	0	0	0	0	0	0
SURPLUS	747	755	762	770	778	785
INCOME STATEMENT						
PREMIUMS EARNED		747	755	762	770	778
LOSSES INCURRED		560	566	572	577	583
OTHER UNDERWRITING EXPENSE		224	226	229	231	233
NET UNDERWRITING GAIN OR (LOSS)		-37	-38	-38	-38	-39
NET INVESTMENT GAIN OR (LOSS)		45	45	46	46	47
NET INCOME		7	8	8	8	8
SURPLUS PRIOR YEAR		747	755	762	770	778
NET INCOME		7	8	8	8	8
SURPLUS YEAR END		755	762	770	778	785
COMBINED RATIO		105.0%	105.0%	105.0%	105.0%	105.0%
ANNUAL RETURN		1.0%	1.0%	1.0%	1.0%	1.0%

12/31/02 SURPLUS:	785
12/31/02 SURPLUS DISCOUNTED @OCC:	488
BEGINNING SURPLUS (INITIAL INVESTMENT):	747
RATIO OF DISCOUNTED SURPLUS TO INITIAL SURPLUS:	0.653

NOTE:

ASSUMES PREMIUM AND LOSSES OCCUR ON 12/31/XX
ASSUMES A 1:1 PREMIUM TO SURPLUS RATIO AT THE BEGINNING OF THE YEAR
ASSUMES AN EXPECTED LOSS RATIO OF 75.0%
ASSUMES AN OTHER UNDERWRITING EXPENSE RATIO OF 30.0%
ASSUMES AN ANNUAL BOND RETURN OF 6.0%
ASSUMES NO TAXES OR INVESTMENT RELATED EXPENSES
ASSUMES SURPLUS RETURNED AT END OF YEAR 5
ASSUMES OPPORTUNITY COST OF CAPITAL (OCC) OF 10.0%

XYZ MUTUAL LOSS RATIO DISTRIBUTION



XYZ CASUALTY MUTUAL COMPANY
Actuarial Appraisal of Economic Value

	12/31/98	10% OCC			12.5% OCC			15% OCC		
	Surplus	Low	Midpoint	High	Low	Midpoint	High	Low	Midpoint	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Appraisal Value Factor		1.14	1.32	1.50	1.00	1.17	1.34	0.88	1.04	1.20
Estimated Surplus (11)	4,299	4,900	5,674	6,448	4,299	5,029	5,760	3,783	4,471	5,158
Value Added (12)		602	1,376	2,149	0	731	1,462	(516)	172	860

(1) XYZ Casualty Company Mutual December 31, 1998 Surplus
(2)-(4) Refer to Appendix E.6, Middle 80% Confidence Interval Range
(5)-(7) Refer to Appendix E.5, Middle 80% Confidence Interval Range
(8)-(10) Refer to Appendix E.7, Middle 80% Confidence Interval Range
(11) Estimated Surplus = Appraisal Value Factor x (1)
(12) = (11) - (1)

XYZ CASUALTY MUTUAL COMPANY

ANNUAL STATEMENT

	Historical	Simulation Years								
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Balance Sheet											
Assets											
Invested Assets	17,219,126	18,443,775	17,515,258	15,975,479	14,356,988	12,735,926	11,227,273	9,860,678	8,639,243	7,559,339	6,614,422
Total Assets	17,219,126	18,443,775	17,515,258	15,975,479	14,356,988	12,735,926	11,227,273	9,860,678	8,639,243	7,559,339	6,614,422
Liabilities											
Loss & Loss Adjustement Expense Reserves	9,228,962	10,142,483	9,792,643	9,001,648	8,128,738	7,228,354	6,380,368	5,607,364	4,913,877	4,299,644	3,762,189
Unearned Premium Reserve	3,691,485	3,230,049	2,826,293	2,473,007	2,163,881	1,893,396	1,656,721	1,449,631	1,268,427	1,109,874	971,140
Total Liabilities	12,920,447	13,372,533	12,618,937	11,474,655	10,292,619	9,121,749	8,037,089	7,056,995	6,182,304	5,409,518	4,733,328
Surplus	4,298,679	5,071,242	4,896,322	4,500,824	4,064,369	3,614,177	3,190,184	2,803,682	2,456,939	2,149,822	1,881,094
Surplus + Liabilities	17,219,126	18,443,775	17,515,258	15,975,479	14,356,988	12,735,926	11,227,273	9,860,678	8,639,243	7,559,339	6,614,422
Income Statement											
Underwriting											
Net Earned Premium	18,583,667	17,362,950	15,192,581	13,293,508	11,631,820	10,177,842	8,905,612	7,792,411	6,818,359	5,966,064	5,220,306
Loss and Loss Expenses Incurred	14,095,264	12,984,023	11,361,011	9,940,891	8,698,284	7,610,986	6,659,621	5,827,173	5,098,761	4,461,436	3,903,741
Underwriting Expenses Incurred	5,368,419	4,732,424	4,140,871	3,623,262	3,170,354	2,774,060	2,427,303	2,123,890	1,858,403	1,626,103	1,422,840
Net Underwriting Gain or (Loss)	(880,016)	(353,498)	(309,301)	(270,645)	(236,819)	(207,204)	(181,312)	(158,652)	(138,805)	(121,475)	(106,275)
Investment & Other Income											
Net Investment Income Earned	1,200,000	1,381,474	1,432,986	1,344,624	1,221,284	1,093,436	968,235	852,632	748,314	655,369	573,449
Net Income Before Tax	319,984	1,027,976	1,123,685	1,073,979	984,465	886,232	786,924	693,980	609,509	533,894	467,174
Federal Income Tax	50,000	356,387	355,587	326,139	296,287	263,553	232,302	203,905	178,389	155,924	136,439
Net Income After Tax	269,984	671,589	768,098	747,840	688,178	622,679	554,622	490,075	431,121	377,971	330,735
Capital and Surplus Account											
Surplus, December 31 Prior Year	4,028,695	4,298,679	5,071,242	4,896,322	4,500,824	4,064,369	3,614,177	3,190,184	2,803,682	2,456,939	2,149,822
Gains or (Losses) In Surplus											
Net Income After Tax	269,984	671,589	768,098	747,840	688,178	622,679	554,622	490,075	431,121	377,971	330,735
+ Capital Contribution / - Dividend to PH		100,974	(943,018)	(1,143,337)	(1,124,633)	(1,072,871)	(978,615)	(876,576)	(777,864)	(685,087)	(599,462)
Surplus, December 31 Current Year	4,298,679	5,071,242	4,896,322	4,500,824	4,064,369	3,614,177	3,190,184	2,803,682	2,456,939	2,149,822	1,881,094

NOTE: Results are based on expected values, before simulating variability

XYZ CASUALTY MUTUAL COMPANY

ANNUAL STATEMENT

	Historical	Simulation Years									
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Cash Flow											
Collected Premium		16,901,514	14,788,825	12,940,222	11,322,694	9,907,357	8,668,938	7,585,320	6,637,155	5,807,511	5,081,572
Net Loss and LAE Paid		12,070,502	11,710,851	10,731,886	9,571,195	8,511,370	7,507,607	6,600,176	5,792,248	5,075,670	4,441,196
Underwriting Expense Paid		4,732,424	4,140,871	3,623,262	3,170,354	2,774,060	2,427,303	2,123,890	1,858,403	1,626,103	1,422,840
Net Cash From Underwriting		98,588	(1,062,897)	(1,414,926)	(1,418,855)	(1,378,073)	(1,265,972)	(1,138,745)	(1,013,496)	(894,262)	(782,464)
Investment Income Received		1,381,474	1,432,986	1,344,624	1,221,284	1,093,436	968,235	852,632	748,314	655,369	573,449
Taxes Paid		356,387	355,587	326,139	296,287	263,553	232,302	203,905	178,389	155,924	136,439
Net Cash From Operations		1,123,675	14,502	(396,442)	(493,858)	(548,190)	(530,039)	(490,019)	(443,571)	(394,816)	(345,455)
Net Surplus Flows		100,974	(943,018)	(1,143,337)	(1,124,633)	(1,072,871)	(978,615)	(876,576)	(777,864)	(685,087)	(599,462)
Total Cash Flow		1,224,649	(928,516)	(1,539,779)	(1,618,492)	(1,621,061)	(1,508,654)	(1,366,595)	(1,221,435)	(1,079,904)	(944,917)
Operating Ratios											
Loss and Loss Expense Ratio (EP)	75.8%	74.8%	74.8%	74.8%	74.8%	74.8%	74.8%	74.8%	74.8%	74.8%	74.8%
PP Auto Liab		78.0%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%
PP Auto Phys Dam		70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
Underwriting Expense Ratio (WP)	27.8%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
Combined Ratio	103.6%	102.8%	102.8%	102.8%	102.8%	102.8%	102.8%	102.8%	102.8%	102.8%	102.8%
Yield on Average Invested Assets	7.2%	7.7%	8.0%	8.0%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%
Percent Non-Invested Assets	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Surplus Flows For IRR	(4,298,679)	(100,974)	943,018	1,143,337	1,124,633	1,072,871	978,615	876,576	777,864	685,087	2,480,557
Cumulative IRR	15.3%										
Leverage Ratios											
Net Written Premium	19,316,016	16,901,514	14,788,825	12,940,222	11,322,694	9,907,357	8,668,938	7,585,320	6,637,155	5,807,511	5,081,572
Premium to Surplus	4.493	3.333	3.020	2.875	2.786	2.741	2.717	2.705	2.701	2.701	2.701
Net L&LAE to Surplus	2.147	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
Invested Assets to Surplus	4.006	3.637	3.577	3.549	3.532	3.524	3.519	3.517	3.516	3.516	3.516
Other Liabilities to Surplus	-	-	-	-	-	-	-	-	-	-	-
Opportunity Cost of Capital (OCC) Analysis											
+ Capital Contribution / - Dividend to PH		100,974	(943,018)	(1,143,337)	(1,124,633)	(1,072,871)	(978,615)	(876,576)	(777,864)	(685,087)	(599,462)
Low OCC - 10.0%		91,794	(779,354)	(859,006)	(768,140)	(666,169)	(552,403)	(449,822)	(362,879)	(290,544)	(231,119)
Midpoint OCC - 12.5%		89,754	(745,101)	(803,002)	(702,103)	(595,367)	(482,722)	(384,346)	(303,168)	(237,341)	(184,602)
High OCC - 15.0%		87,803	(713,057)	(751,763)	(643,013)	(533,407)	(423,082)	(329,537)	(254,285)	(194,745)	(148,178)

(1)	Statutory Surplus @12/31/98	4,298,679
(2)	Reserve Redundancy/(Inadequacy)	-
(3)	Market Value Adjustment (Schedule DM)	-
(4)	Surplus Adjustments	-
		10 Year
(5)	Estimated Value - 10.0%	5,592,884
(6)	Estimated Value - 12.5%	4,927,273
(7)	Estimated Value - 15.0%	4,368,241
(8)	Ratio to Surplus - 10.0%	1.301
(9)	Ratio to Surplus - 12.5%	1.146
(10)	Ratio to Surplus - 15.0%	1.016

Note

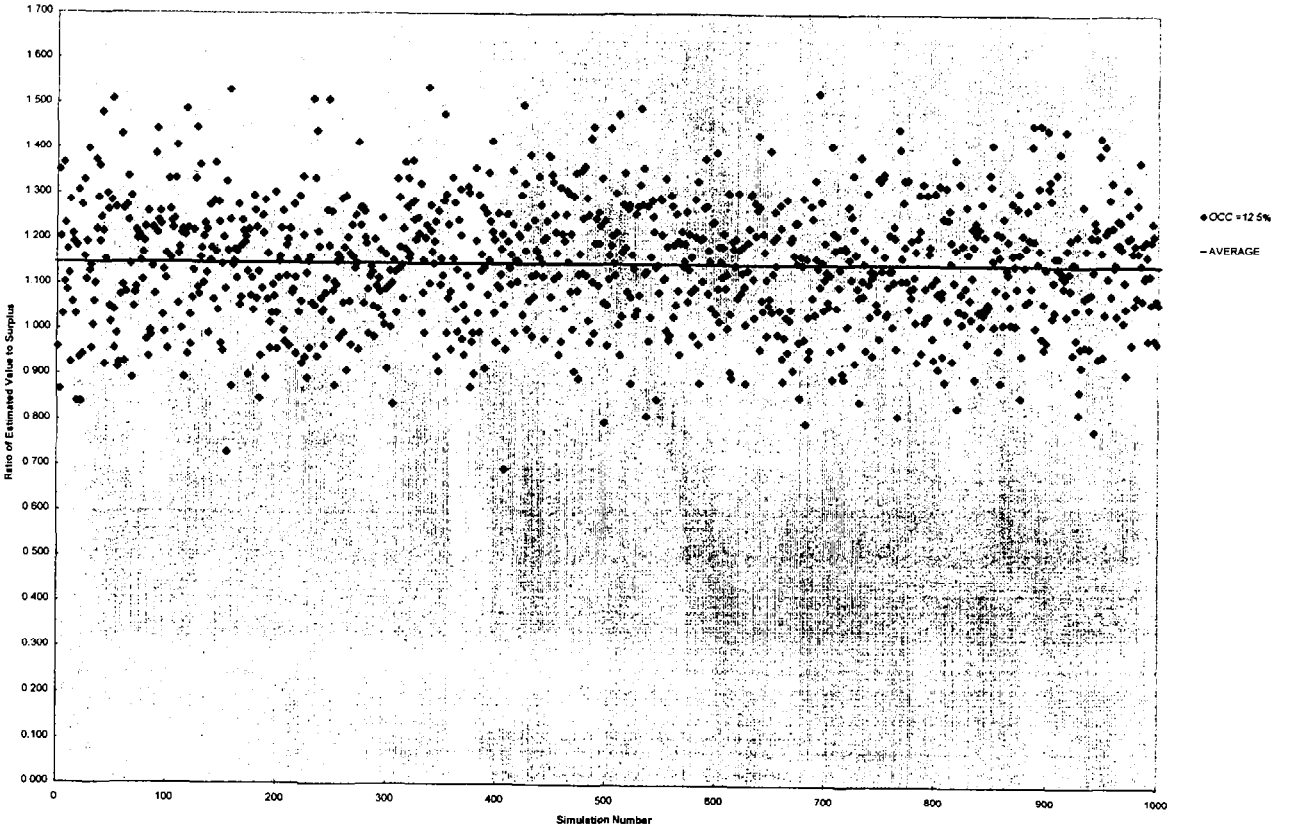
(1) 1998 Annual Statement
(2) 1998 Actuarial Report and Internal Analysis
(3) Schedule DM of the Annual Statement
(4) = (2) + (3)
(5) = (4) - CC/Div to PH + Return of Ending Surplus discounted at the low OCC
(6) = (4) - CC/Div to PH + Return of Ending Surplus discounted at the midpoint OCC
(7) = (4) - CC/Div to PH + Return of Ending Surplus discounted at the high OCC
(8) = (5) / (1)
(9) = (6) / (1)
(10) = (7) / (1)

NOTE Results are based on expected values, before simulating variability

APPENDIX E.4

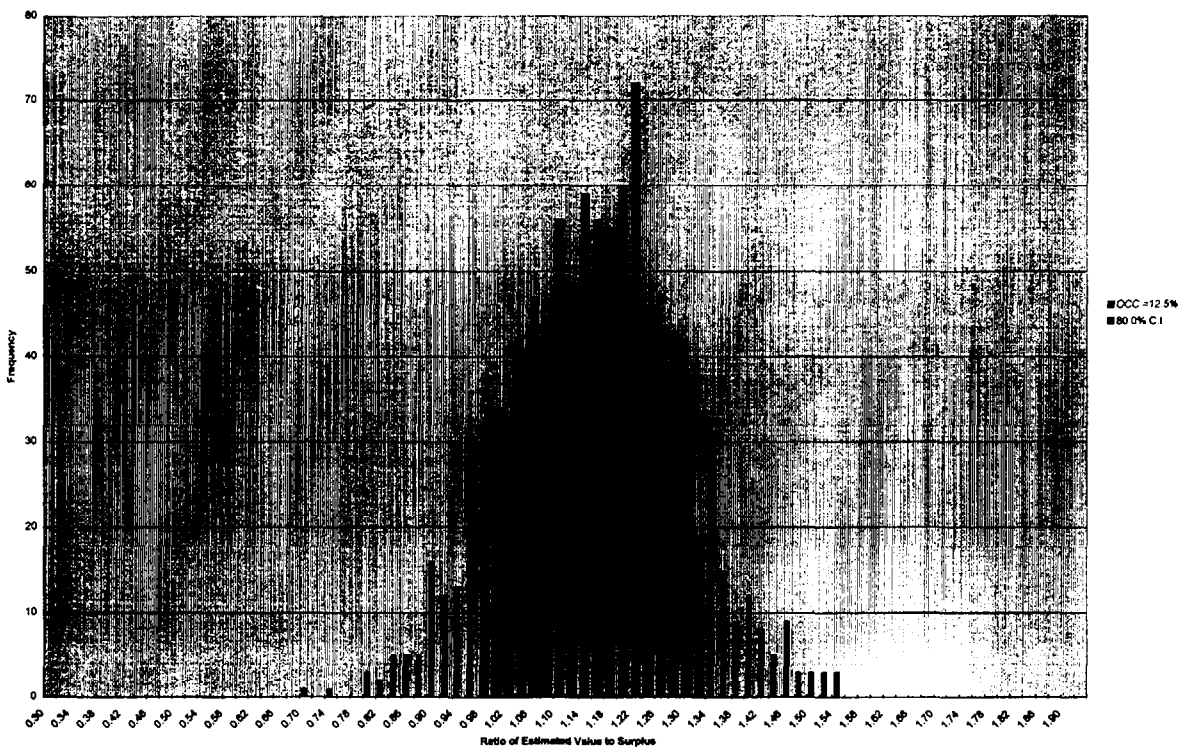
XYZ CASUALTY MUTUAL COMPANY

SIMULATION OF ESTIMATED COMPANY VALUE TO 12/31/98 STATUTORY SURPLUS
ASSUMING SURPLUS RETURNED AT END OF YEAR 2008



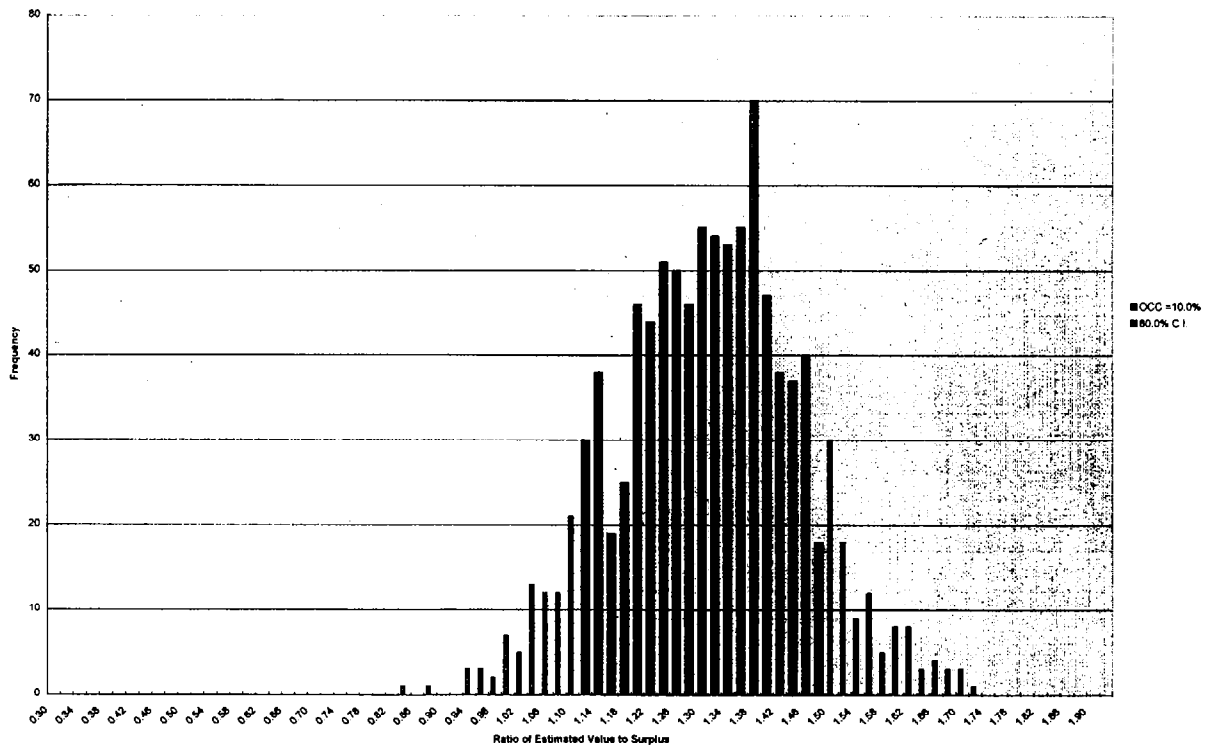
XYZ CASUALTY MUTUAL COMPANY

DISTRIBUTION OF ESTIMATED COMPANY VALUE TO 12/31/98 STATUTORY SURPLUS
ASSUMING SURPLUS RETURNED AT END OF YEAR 2008



XYZ CASUALTY MUTUAL COMPANY

DISTRIBUTION OF ESTIMATED COMPANY VALUE TO 12/31/98 STATUTORY SURPLUS
ASSUMING SURPLUS RETURNED AT END OF YEAR 2008



XYZ CASUALTY MUTUAL COMPANY

DISTRIBUTION OF ESTIMATED COMPANY VALUE TO 12/31/98 STATUTORY SURPLUS
ASSUMING SURPLUS RETURNED AT END OF YEAR 2008