Article Title: ARCHIVE | Criteria | Insurance | General: Dynamic Financial Analysis and Rating Agency Models: Room for Both Data: (EDITOR'S NOTE: —This article is no longer current. It has been superseded by "Methodology: Assessing Insurers' Economic Capital Models," published May 15, 2008.) In recent years, industry watchers have become increasingly focused on the models used by Standard & Poor's to analyze (re)insurers' capital adequacy, partly because such models are freely available and very transparent. In particular, certain commentators have questioned why Standard & Poor's has not adopted the latest modeling techniques--particularly Dynamic Financial Analysis (DFA)--that are available in the market. This misunderstands both the rating process and the use of models within the process. Capital Analysis and the Rating Process Ultimately, the key objective in applying any analytical tool is to come up with a rating that should be a robust and comprehensive evaluation of a (re)insurer's financial strength. Capital analysis, whether using a dynamic modeling approach or a static risk-based analysis, is merely one tool among many to be used when assessing capital adequacy. It is not a substitute for a comprehensive analysis of all the relevant factors that contribute to financial strength. There can be no single measure that fully captures the breadth of information needed to evaluate a (re)insurer's level of capital adequacy. All too often, both company management and outside analysts focus on the management of capital to a specific ratio and ignore the larger risks inherent in the organization. For example, the foundation of a (re)insurer's capital base can differ significantly based on its quality of capital. Since Standard & Poor's ratings are determined in both absolute and relative contexts--a (re)insurer's measure of financial strength should be consistent with various standards set for each rating category as well as consistent with other companies with similar ratings--Standard & Poor's considers that multiple views of capital adequacy better capture this element of financial strength. Although considerable attention is paid to capital adequacy, Standard & Poor's also assesses many other factors before determining the insurer financial strength rating on a company. Standard & Poor's rating process will continue to be based on the belief that capital adequacy ratios are not a substitute for a broad-based analysis of (re)insurer credit quality. Strengths or weaknesses in other key areas--such as a company's management and corporate strategy, business position, operating performance, liquidity, and financial flexibility (defined as the ability to source capital relative to requirements)--can more than offset relative strengths or weaknesses in capital adequacy. The Role of Models Both static risk-based analysis and dynamic modeling offer important insights into the strength of (re)insurers and, conversely, both are saddled with significant drawbacks, which are recognized by Standard & Poor's. A static risk-based capital analysis offers a consistent analysis of (re)insurers that is transparent, easily understood, and can be compared across time for the same (re)insurer. Such models are retrospective, however, and ignorant of trends that might impair future financial strength, including changes to premium pricing and exposure. These models fail to identify nuances within risk categories and do not recognize the interplay of various risks. No one type of model offers the best answer. As (re)insurers attempt to balance financial strength with capital management, they continually seek new risk management techniques to better manage capital. Often, this means persuading regulators and rating agencies that the risks that they have assumed differ materially from industry averages. As is the case with most static capital models, Standard & Poor's capital adequacy ratio assesses risks while maintaining a standard of comparison among companies. This means that classes of risk are evaluated similarly from company to company as part of Standard & Poor's normal surveillance of the capital needs of the (re)insurers it rates. DFA – a Universal Panacea? DFA can be loosely defined as a financial modeling framework that is designed to project results under a variety of scenarios, showing how outcomes may be affected by changing risk conditions. It uses one or, more often, a number of models, both deterministic and stochastic, which are designed to simulate the economic impact of changes in underlying variables (such as changes in interest rates and business mix). The economic impact is usually analyzed by way of cash flows generated by the models. DFA has its origins as far back as World War II, and more latterly has been used by large industrial corporations as a tool to test the strategic options available to management. It gained real publicity in its alleged role in the failure of Long-Term Capital Management, and has been used by various sections of the (re)insurance industry for at least a decade. The attractions of DFA are clear. Dynamic financial models are valuable in effectively analyzing the complex interrelations of variables relevant to a (re)insurer's results. DFA allows management to quantify what effects their decisions could have on their company's

revenues and costs. In particular, it assists management in understanding the complex interrelationship between assets and liabilities, an area that has historically been somewhat compartmentalized, particularly in the non-life market. DFA is not designed to predict what will happen in the future, but rather to allow quantification of the various outcomes and therefore comparison of the options available to management. The drawbacks of dynamic modeling, particularly in their application as a one-stop arbiter of financial strength, are equally challenging, however. Some of the issues are as follows: There is a lack of market standards for DFA models, and therefore a lack of consistency in the underlying assumptions, as the models are tailored to the specific portfolios of a (re)insurer. The transparent 'one-size-fits-all' approach that is required by the rating agencies to allow comparison across all companies cannot be easily facilitated by the use of such models. Insurance concerns rarely fail solely as a result of catastrophe events. The most common cause of failure is endemic underpricing over a period of several years and/or poor underwriting controls. Many DFA models work on a limited time horizon and do not fully capture these 'slow-burn' operational issues. The experience of catastrophe modeling agencies is pertinent. The main agencies have considerable resources and expertise at their disposal; they are significant users of DFA and deal with but one facet of the risks facing (re)insurers. Nevertheless, there can be significant variations in the results generated by each of the modeling agencies for relatively similar scenarios. While DFA models are able to quantify the economic benefits of diversity due to the stochastic techniques embedded in the models, they do not take into account a variety of qualitative factors that ultimately determine the success of a diversification strategy. For instance, what will the effect on performance be of the additional management time required for the new business and can the company write the new line of business as well as historical statistics suggest? A big challenge facing the users of DFA is to ensure that the data used to generate the results is accurate and up to date. Due to the complexity of these models, significant amounts of data are required. Errors in the data can be compounded, resulting in 'garbage in, garbage out'. Notwithstanding the widespread acceptance of the techniques used in DFA, the concept is still relatively new. Even within some of the larger (re)insurance groups, a fully integrated modeling approach has only been used for a couple of years. Consequently, the validity of these models in a number of cases has yet to be fully tested under real world circumstances. It is interesting to note that many of these models are calibrated to a risk of ruin equivalent or higher than an observable 'AAA' default rate. At the same time, the levels of solvency capital required under the models are often lower than those that have been historically held by the industry. While this does not suggest that the models are wrong, there is clearly a need to test them over a longer period of time. Building a robust model and populating it with quality data is only part of the challenge; the effectiveness of the model also depends on how a company's management uses the information generated in its risk management process and how clearly a company can communicate what the results mean, both internally and externally. Management's understanding of how the model itself works is also critical; slavish reliance on the output from a 'black box' has obvious dangers. To understand DFA is to understand its limitations. Incorporating DFA into the Rating Process Standard & Poor's considers the usage of such dynamic financial models to be an important part of management's decision-making processes and, for the more complex (re)insurance groups, would expect DFA to be used widely on an integrated basis. Even for less complex groups in the (re)insurance industry, Standard & Poor's would expect a company's management to use the techniques available either via a bespoke or off-the-peg model sold by the modeling agencies to model its exposure to catastrophe risks. As part of its rating process, Standard & Poor's discusses with management its use of such models and how they are incorporated into the decision-making process. These discussions give Standard & Poor's valuable insight into the risk tolerance of the management concerned and the strength of the (re)insurer's risk management processes. Futhermore, if companies can demonstrate--and Standard & Poor's can validate--that they have materially reduced their risks either through superior risk management techniques or through contractual protections, then Standard & Poor's will adjust its capital adequacy model to reflect the (re)insurer's reduced capital needs. Standard & Poor's remains open to the further incorporation of DFA methodologies into its insurance rating process. It has and will continue to look at the potential of the various models produced by companies and consultants involved in the industry. Indeed, Standard & Poor's has already developed its own sophisticated modeling tools and processes to analyze the financial markets and credit and

insurance risks existing at (re)insurance companies, and has successfully applied them to the closed blocks and spread lending businesses of a growing number of U.S. (re)insurance companies. This dynamic modeling approach enables Standard & Poor's to arrive at a rating that reflects a company's actual level of risk tolerance (risk profile) and the risk management practices employed by the company, such as hedging techniques, underwriting, and contractual protection. However, Standard & Poor's limits the application of these advanced techniques to companies that analyze, report, and manage their risks in a sophisticated manner--consistent with Standard & Poor's modeling--and that therefore typically produce a risk profile that is more conservative than industry norms. DFA is unlikely to fully replace the blend of qualitative and quantitative analysis that Standard & Poor's requires to determine a rating, in the same way that such models will never fully replace the skills of the management and underwriters of those (re)insurers that the rating agencies rate. Analyst E-Mail Addresses stephen_searby@standardandpoors.com mark_puccia@standardandpoors.com rob_jones@standardandpoors.com InsuranceInteractive_Europe@standardandpoors.com