

Article Title: ARCHIVE | Criteria | Insurance | Life: Revisions To Standard & Poor's Life Insurance Capital Adequacy Model For 2001 Data: (EDITOR'S NOTE: —This article is no longer current. It has been superseded by an article titled "Analysis Of Insurer Capital Adequacy," which was published on April 22, 2009.) Standard & Poor's has revised its life insurance capital adequacy model for 2001, in which it recognizes and adopts certain changes approved by the National Association of Insurance Commissioners (NAIC) for Standard & Poor's life insurance company risk-based capital model and makes other changes to the assessment of C-1 (asset) and C-2 (liability) risk. The revisions apply to all mandatorily convertible securities, reinsurance recoverables, interest-rate risk, and separate account liabilities. For mandatorily convertible securities, Standard & Poor's will follow the NAIC guidelines and adopt the latter's methodology in assigning the proper C-1 asset risk charges to these investment types. In the case of net reinsurance recoverables, Standard & Poor's will no longer apply a default C-1 risk charge of 5 basis points (bp) but will charge net reinsurance recoverables based on the credit quality of the reinsurer as determined by Standard & Poor's. Standard & Poor's has further revised its interest-rate risk stress scenario to plus 270bp from plus 300bp. In addition, it has adjusted the C-2 risk charges associated with nonguaranteed separate account liabilities in recognition of the economies of scale that exist for liability blocks exceeding \$25 billion. Lastly, Standard & Poor's recognizes the significant changes made by the NAIC in its evaluation of C-3 interest-rate risk charges and will monitor the effects this change will have on insurers' NAIC risk-based capital for year-end 2000. Revisions For Year-End 2000 C-1 risk charges for reinsurance recoverables. Credit risk reflects the collectibility risk associated with certain assets or receivables on the balance sheet. The risk inherent in reinsurance recoverables is important for certain life insurance companies. Standard & Poor's can draw on its worldwide experience and its ratings on domestic and international reinsurance companies to derive the factor for this risk analysis. Specifically, Standard & Poor's determines the default rate of reinsurance companies by rating category, to determine the appropriate charge for each rating. This charge is then applied to the recoverables from reinsurers that fall into the specific rating category to derive a total charge. Reinsurers under some form of regulatory control are deemed to be similar to a 'CCC' reinsurer; reinsurers that do not have a rating are deemed to be similar to 'B' reinsurers. C-1 risk charges on mandatorily convertible securities. For securities that are mandatorily convertible into a different type of security at prices different from the market prices at the time of conversion, the risk charge should equal the statement value times the higher of: the factor appropriate to the securities in the absence of the conversion features; and the factor appropriate to the security as a result of the conversion. Measurement of C-3 risk charges. In general, the NAIC is now requiring that some companies do additional cash flow scenario testing of certain products (mainly single-premium life, some equity index, and various annuity products). Those companies can choose between doing a set of 12 or 50 interest-rate generated scenarios. A methodology for the cash flow test is selected by the company based on aggregate surplus, or surplus by product or line of business. However, for any of those methods, the worst negative surplus year in each scenario is discounted to calculate the present value. All the scenarios' present values are then ranked from higher levels to lower levels. The C-3 added exposure measure is 100% of the weighted average of these present values. The NAIC provides a rule for the weights used in this calculation. Standard & Poor's has always used more conservative C-3 risk charges than the NAIC. After careful analysis of the NAIC's newly adopted method, Standard & Poor's has decided not to adopt these changes, but instead to monitor the effects that the new NAIC C-3 risk charges will have on an insurance company's NAIC risk-based capital. More specifically: Standard & Poor's will request that companies provide it with the NAIC risk-based capital C-3 pages and the new C-3 cash flow test worksheet, as part of the Standard & Poor's 2000 annual life insurance rating survey. Based on its review of this information, Standard & Poor's may require certain companies to hold additional capital for C-3 risk. This would be based on Standard & Poor's assessment of the relative magnitude of any additional NAIC-based C-3 risk charges as a result of the NAIC's new method, as well as conversations with the company to better understand the reasons for the increased risk charges. For those companies that do not comply with this request, Standard & Poor's may add an additional 1% C-3 charge to the existing charges. Standard & Poor's will monitor the company's additional NAIC-based C-3 charges from the cash flow test results (if applicable), considering changes to its existing C-3 risk charges based on completion of the review of this newly adopted NAIC

methodology. C-2 charges for separate account nonguaranteed liabilities. Separate account nonguaranteed liabilities receive a C-2 risk charge that is intended to cover a multitude of risks, including expense risk, administration risk, regulatory risk, and litigation risk. With the introduction of the NAIC's C-1 charge on nonguaranteed separate account surplus into the Standard & Poor's capital model in 1998, Standard & Poor's recognized that the C-1 charge included items that Standard & Poor's included as part of the C-2 charges. Standard & Poor's has therefore decided to revise the current sliding scale used to calculate C-2 charges for separate account nonguaranteed liabilities. The decision was based on the assumption that larger size blocks of separate account nonguaranteed liabilities contain economies of scale that tend to offset expense-related items associated with C-2 risk charges. The revision provides a lower charge to separate account liability balances exceeding \$25 billion, by reducing the charge to 6bps from 10bps.

Interest-rate risk. The formula for 2001 will change the interest-rate stress scenario to plus 270bp from plus 350bp, leaving the down scenario at minus 200bp.

The Role of Standard & Poor's Capital Adequacy Model Standard & Poor's capital adequacy model plays a significant role in the assessment of the capital strength of a life/health insurer. The model produces a capital adequacy ratio that compares adjusted capital and surplus, minus realistic expectations of potential investment losses, with a base level of surplus appropriate to support liabilities at a secure rating level (i.e., 'BBB'). Standard & Poor's standards for superior, excellent, good, and adequate capital strength are based on this ratio. To be minimally secure (i.e., 'BBB'), the capital adequacy ratio must be at least 100%. The capital adequacy ratio is only a starting point for judging capital adequacy, however. Qualitative and quantitative enhancements are applied as warranted, to derive a more complete picture of an insurer's capital position. The analyst plays a critical role in adjusting the model to assess risks that are unique to a company, while maintaining a standard of comparability between companies.

How the Model Works The numerator of the capital adequacy ratio is total adjusted capital (defined below) minus realistic expectations of potential investment losses. The total asset-risk (C-1) charge is adjusted by multiplying by a portfolio size factor and adjusting for any single-issuer concentration risk. The denominator of the ratio is derived by going through the same process for liabilities, i.e., by applying risk factors to each type of liability (C-2 and C-3 risks). The last ingredient in the denominator is a general business-risk charge (C-4) that is assessed against U.S. premiums.

Table 1 Insurance Risk (C-2) LIFE INSURANCE NET AMOUNT AT RISK INDIVIDUAL AND INDUSTRIAL GROUP AND CREDIT

First \$500 million	0.0020	0.0016
Next \$4.5 billion	0.0013	0.0011
Next \$20 billion	0.0010	0.0008
Greater than \$25 billion	0.0008	0.0007

Nonguaranteed Separate Account Liabilities Factor

First \$5 billion of reserves	0.0025
\$5 billion to \$25 billion of reserves	0.001
Greater than \$25 billion of reserves	.0006

Table 2 Interest-Rate Risk (C-3) Factors

LOW-RISK CATEGORY FACTOR	
Life insurance reserves net of reinsurance and policy loans	0.005
Annuity reserves with market value adjustment (crediting rate guaranteed for up to one year)	0.010
Medium-Risk Category Factor	
Annuity reserves not withdrawable (excluding structured settlements)	0.020
Annuity reserves with surrender charges	0.020
Exhibit 10 reserves not captured elsewhere	0.020
Guaranteed investment contracts or annuity reserves with market value adjustment and crediting rate guaranteed for more than one year	0.020
High-Risk Category Factor	
Annuity reserves with no adjustments	0.030
Structured settlements	0.030
Single premium individual annuities (such as pension closeouts)	0.030

Table 3 Business Risk Factors (C-4) PREMIUMS SUBJECT TO GUARANTY FUND ASSESSMENT FACTOR

U.S. life and annuity premiums	0.020
U.S. health premiums	0.005
U.S. separate account liabilities	0.0005

Determining total adjusted capital. Total adjusted capital is statutory capital and surplus, plus the asset valuation reserve (AVR), plus voluntary reserves, plus 50% of the policyholder dividend liability. Analysts may add or subtract to this to include items, such as surplus notes, that meet Standard & Poor's criteria as capital. If surplus notes (or other hybrid instruments being given equity credit) represent greater than 15% of total capital, Standard & Poor's will give less equity credit for the note; in most cases, treating the excess as debt. Surplus notes (or other hybrid instruments being given equity credit) are amortized at 20% per year beginning 10 years before maturity or potential call by the holder. As a result, these instruments have no equity credit by the fifth year before maturity. Evaluating asset risks. Standard & Poor's looks at the quality of an insurer's investment portfolio to establish a reasonable estimate of expected losses over several years. The present value of these anticipated losses is charged against surplus, but is also adjusted for any explicit

statutory loss reserves that an insurer may have already set aside. Bonds. Charges for credit risks vary with the bond's credit rating. Expected default losses are assumed to occur over 10 years and are given a present value at an 8% discount rate, starting in year 2 (no discount is given in year 1). These gross charges are adjusted for an assumed 50% recovery rate. Although the expected incidence of default used in the model for most rating classes agrees fairly well with recent experience, Standard & Poor's uses a conservative 9% incidence of default for 'BBB'-rated bonds. Standard & Poor's believes recent history, during a benign economic period, is not indicative of the long-term risk associated with this rating category. Charges for collateralized bond obligations are based on the ratings on the tranches, provided the company retains less risk than it would by holding the underlying securities. Analytical judgment is used in determining appropriate charges for bonds of a parent or affiliate company. In the absence of the information necessary to make this judgment, such bonds are assessed a risk charge of 100% of their carrying value. Standard & Poor's model includes charges for interest-rate risk associated with bonds, particularly mortgage-backed securities (MBS), but also includes other negatively convex securities such as callable corporates, asset-backed securities, and commercial mortgage-backed securities. Relative to a life insurer's positively convex liabilities, these negatively convex assets can create, and have created, shortfalls that Standard & Poor's tries to capture in the capital model. The stress scenarios used in testing these securities depend on the interest rates at year-end. In most cases, Standard & Poor's bases these charges on modeling and testing of the insurer's actual portfolio. If modeling or other means of testing the underlying interest-rate optionality of an asset class is not practical, Standard & Poor's assesses a charge of 4.5% for MBS, 2%-4% for home equity and manufactured housing asset-backed securities, and 1% for other asset-backed securities. Preferred stock. Preferred stock is treated like bonds, except that no recovery is expected in the event of default. Equity assets. Standard & Poor's analysis of stock market movements indicates that a 15% risk factor is appropriate for unaffiliated common stock holdings. This represents one standard deviation in the S&P 500 Stock Index year-to-year change, as calculated since 1945. Commercial and agricultural mortgages. Separate charges are applied to performing and problem loans. The factor for performing commercial and agricultural mortgages is 0.02 times (x) an experience adjustment factor, but the minimum factor applied to performing mortgages is 0.01x regardless of experience. The experience adjustment factor is the ratio of the company's problem mortgages to the industry average and is applicable only if the company has a seasoned portfolio of mortgage investments. The factor for performing commercial and agricultural mortgages was derived as an estimate of the present value of the incidence of default, offset by expected recoveries. Problem mortgages include: foreclosed, those in the process of foreclosure, those that are 30 days overdue, and those that have been restructured or modified. A watch list initially totaling the larger of the company watch list or 33% of actual problem mortgages is calculated as a starting point, then adjusted as necessary to reflect individual portfolio strengths or weaknesses. A separate charge is applied to actual problem loans plus the watch list -- a 6% annual charge applied for three years and given a present value at an 8% discount rate starting in year 2 (no discount is given in year 1). Mortgage data is extracted from each insurer's response to Standard & Poor's periodic real estate and mortgage questionnaire. Recent data for companies with interactive financial strength ratings indicate that problem mortgages (not including any watch list) represented about 14% of the mortgage portfolio. However, this does not account for the recent increase in aggressive issuance of mortgages by insurers following a period of relatively conservative mortgage lending. Mortgages currently issued by insurers may well carry inherent default rates closer to 18%, which prevailed a few years ago. The Commissioners' Reserve Valuation Method (CRVM) or the Commissioners' Annuity Reserve Valuation Method (CARVM) expense allowance transfers related to nonguaranteed separate accounts. The charge will be 2% of the CRVM or CARVM expense allowance if the current surrender charge is based on fund contributions, applying only to those contracts where the fund balance exceeds the sum of premiums less withdrawals; otherwise the charge is 10%. The 2% factor Standard & Poor's adopted reflects a conservative assumption that, over the long term, problem mortgages will be 18% of the average company's portfolio. Similarly, the average watch list for companies with interactive financial strength ratings was about 17% of problem mortgages in recent years, but Standard & Poor's believes 33% more accurately reflects the likely extent of watch-list mortgages in the long term. Affiliated common stock. Common stock of a parent is

assessed a 100% charge. Insurance subsidiaries are analyzed to determine whether they are strategically important; if so, their assets and liabilities are consolidated into the parent company's capital model. When such risk charges are assessed, the 15% factor for common stocks does not apply, full equity credit is given for the affiliate's stock, and adjustments are made to the parent's total adjusted capital to reflect the subsidiaries' AVR and policyholder dividend liability. The treatment of affiliates deemed not strategically important involves a C-1 charge representing the capital deemed necessary for the ratings, if a stand-alone rating exists, or at the 'BBB' level if it does not. The analyst consults with other departments in Standard & Poor's to determine the appropriate capitalization levels for noninsurance subsidiaries. Real estate. Standard & Poor's applies an 18% risk factor to this asset class, reflecting its opinion that real estate, on average, presents a greater risk than common stock. Schedule BA (other assets). The risk charges for this category reflect the range of asset types in this schedule. Surplus in nonguaranteed separate accounts. This item is assessed a 10% charge; the factor may be adjusted to reflect the actual risk of the underlying assets. This item includes the expense allowance transfers related to nonguaranteed separate accounts. Assets in separate accounts with guarantees. The charges used depend on the nature of the underlying assets and should correspond to the charges that would be made if the assets supporting guaranteed liabilities were in the general account. Modified coinsurance and funds withheld reinsurance. For all modified coinsurance and other reinsurance transactions with funds withheld, in which the default risk is transferred, the transferred funds will be recognized by reducing the C-1 risk charge for the ceding company and increasing the C-1 risk charge for the assuming company in accordance with the assets ceded/assumed. Size factor. Standard & Poor's incorporates a size factor based on total invested assets, which is multiplied against the insurer's total asset default risk charge, subject to a minimum level of 1x, whereby the largest insurers would still be subject to the full asset charges determined by Standard & Poor's. Concentration risk. All assets with credit risk associated with a single issuer are aggregated to assess concentration risk. Graded charges are assessed when single-issuer concentrations exceed 15% of total adjusted capital for investment-grade bonds, or 10% for other types of assets. Table 4 Asset Default/Loss-Risk Factors (C-1) BONDS 50% RECOVERY RATE/8% DISCOUNT RATE Rating Incidence of Default Assumption Net factor Exempt obligations 0% 0.0000 'A' or higher 1.15% gross charge 0.115% evenly over 10 years 0.0042 'BBB' 9% gross charge 0.9% evenly over 10 years 0.0326 'BB' 20% gross charge 2.4% years one to five; 1.6% years six to 10 0.0752 'B' 35% gross charge 5% years one to five; 2% years six to 10 0.1372 'CCC' 50% gross charge 8% years one to five; 2% years six to 10 0.2018 In or near default 30% net charge 0.3000 Preferred stock Same as bonds, except no recovery in event of default. Net factors are exactly double those for bonds. Interest-rate risk Assessed for mortgage-backed securities (MBS), callable corporates, and other securities, determined individually for each portfolio (default factor 0.045 MBS; 0.020 home equity, 0.010 ABS) Commercial/farm mortgages Problem 18% gross charge, 6% years one to three 8% discount rate 0.1670; 0.02 times experience adjustment factor Performing 2% on average, adjusted for experience relative to industry experience adjustment factor equals co. problem mortgage % divided by 14% 0.5 minimum experience adjustment factor Insured mortgages In good standing 0.001 90 days overdue 0.002 Residential mortgages In good standing 0.005 90 days overdue 0.010 Due and unpaid taxes On overdue (90 days) mortgages and mortgages in foreclosure 1.000 Common stock Nonaffiliated 0.150 Affiliated Parent: exclude insurance subsidiary, consolidate all others: 100% (analyst may adjust) 1.000 Real estate Investment 0.180 Foreclosed encumbrances 0.150 Property used to deliver health care 0.100 Schedule BA Bonds, preferred, or common Use the factor for the asset category Schedule BA mortgages and real estate 0.200 Other Schedule BA assets 0.300 Other assets Surplus in nonguaranteed separate accounts 0.100 Assets in separate accounts backing guaranteed separate accounts: pro forma treatment for assets as if in general account The Commissioners' Reserve Valuation Method (CRVM) or the Commissioners' Annuity Reserve Valuation Method (CARVM) expense allowance transfers related to nonguaranteed separate accounts. The charge will be 10% if the current surrender charge is based on the fund balance and 2% of the CRVM or CARVM expense allowance if the current surrender charge is based on fund contributions, applying only to those contracts where the fund balance exceeds the sum of premiums less withdrawals; otherwise the charge is 10% 0.100/ 0.020 Cash, short-term investments, nongovernment money market funds not qualifying

for Schedule DA treatment 0.003 Premium notes; collateral loans; write-ins 0.050 Net reinsurance recoverable Based on the credit rating of the underlying reinsurer Noncontrolled assets 0.010 Off-balance-sheet items Long-term leases (present value, discounted at 8%) 0.050 Asset size factors Multiply asset charges by asset size factor (minimum asset size factor = 1): Size factor = Total weighted dollar amount divided by total invested assets. Size factor = [(First \$100 million invested assets times 2.5) plus (next \$100 million times 1.5) plus (more than \$200 million times 0.8)]/[total invested assets]. Table 5 Single Issuer Concentration PERCENTAGE OF TOTAL ADJUSTED CAPITAL FACTOR (MAXIMUM TOTAL CHARGE 1.0) 10% to 25% (15% to 25%) 0.20 plus base asset factor 26% to 50% 0.40 plus base 51% to 75% 0.60 plus base 76% to 100% 0.80 plus base More than 100% 1.0 Evaluating Liability Risks The factors applied to liabilities reflect Standard & Poor's assumptions about the threshold level of capital necessary to absorb, in aggregate, mortality, morbidity, lapsing, expense, and interest-rate mismatch risks for securely rated companies. Life and health. For the most part, Standard & Poor's evaluation of C-2 risks for life insurance (mortality, expense, persistency, and other pricing risks) is similar to the NAIC's approach, although most of Standard & Poor's factors are more conservative. In the health insurance line, Standard & Poor's incorporates liability factors that recognize differences in risk by product (for example, the degree of managed care inherent in medical products). No credit is applied for the premium stabilization reserve. For companies that assume life reinsurance, Standard & Poor's generally applies a surcharge of 25%-50% of the standard applicable factors, reflecting Standard & Poor's opinion that the reinsurer has less control over the risk than the issuing company. Annuities. Annuity lines are considered low-, medium-, or high-risk and are assessed charges of 1%, 2%, and 3%, respectively. Annuity reserves with market-value adjustments and short-term guarantees are considered low risk. The medium-risk category includes annuity reserves with surrender charges. Standard & Poor's assumes the surrender charges on an insurer's block of annuities are fairly evenly distributed among the standard range for surrender charges. Model adjustments may be appropriate when this assumption is not valid. Other products viewed as medium-risk include: annuity reserves that cannot be withdrawn, annuity reserves with market-value adjustments and rates guaranteed for more than a year, and guaranteed investment contracts (GICs). The high-risk category includes structured settlements and single-premium immediate annuities, which are often long-tail liabilities that can present difficult asset/liability management (ALM) challenges. Standard & Poor's capital model does not include any reduction in its risk factors based on the company's having an unqualified actuarial opinion on the appropriateness of the ALM process. Separate accounts with guarantees. The charges Standard & Poor's uses depend on the type of guarantee and should correspond to the charges that would be made if these liabilities were in the general account. Table 6 Health Insurance--Liability Risk Factors COMPREHENSIVE MEDICAL AND HOSPITAL OR MEDICAL ONLY FACTOR Traditional indemnity Earned premium first \$25 million 0.17 Earned premium more than \$25 million 0.10 Indemnity with retrospective experience rating Earned premium 0.10 Contractual fees Earned premium first \$25 million 0.14 Earned premium more than \$25 million 0.085 Bonus/withhold arrangements Earned premium first \$25 million 0.13 Earned premium more than \$25 million 0.075 Capitation Earned premium first \$25 million 0.075 Earned premium more than \$25 million 0.05 Noncontingent salaries Earned premium first \$25 million 0.055 Earned premium more than \$25 million 0.036 Administrative services only/contracts Premium equivalent first \$500 million 0.02 Premium equivalent more than \$500 million 0.0075 Stop loss Earned premium 0.33 Federal Employee Health Benefit Program Earned premium 0.04 Medicare supplement Earned premium first \$25 million 0.12 Earned premium more than \$25 million 0.08 Dental Earned premium first \$25 million 0.10 Earned premium more than \$25 million 0.07 Hospital indemnity, accidental death and dismemberment, and other limited benefits not anticipating rate increases Earned premium 0.08 Other limited benefits anticipating rate increases Earned premium 0.12 Disability Individual noncancellable disability income Earned premium first \$50 million 0.35 Earned premium more than \$50 million 0.15 Other individual disability or group disability Earned premium first \$50 million 0.25 Earned premium more than \$50 million 0.15 Long-term care Earned premium first \$50 million 0.25 Earned premium more than \$50 million 0.15 Claim reserves Exhibit 9 individual and group and credit claim reserves 0.05 Note: for all of the above, add 2.4% to base factors if rates are guaranteed for 15 to 36 months; add 6.4% if rates are guaranteed for more than 36 months. Modified coinsurance and funds withheld

reinsurance. For all modified coinsurance and other reinsurance transactions with funds withheld, in which the mortality, morbidity, and interest-rate risks are transferred, the transferred risk will be recognized by reducing the C-2 and C-3 risk charges for the ceding company and increasing the C-2 and C-3 risk charges for the assuming company in accordance with the liabilities ceded/assumed.

General Business Risk Factor The model incorporates a charge for general business risk that is based on the company's premiums written in the U.S. and separate account liabilities, as reported in the annual statutory statement. Standard & Poor's uses this measurement as a proxy for business risk, mirroring the NAIC's approach. Adjustments to the Model Standard & Poor's capital adequacy model creates a reasonably consistent initial approach to measuring insurers' capital adequacy. Still, results are primarily guideposts, not absolute benchmarks, by which to gauge capital adequacy. A vital part of the assessment of capital adequacy incorporates both qualitative and quantitative adjustments to the model. These adjustments may consider: A company's ability to generate capital internally and to fund its own growth through statutory earnings. All else being equal, Standard & Poor's views companies with long track records of consistently good earnings as having a stronger capacity for reliable surplus development than companies with more volatile performance. Standard & Poor's also considers an insurer's prospective growth plans in conjunction with management's commitment to maintaining or enhancing surplus adequacy. Capital needs of a parent, affiliate, or subsidiaries. Standard & Poor's considers potential calls on capital by affiliates that may look to the rated entity for future capital support, or by parent companies that may make increasing demands for dividends. Conversely, a parent's, subsidiary's, or affiliate's ability to provide future surplus support may have a positive effect on how Standard & Poor's views an insurer's capital strength. Quality of asset/liability management techniques. Standard & Poor's views companies willing to accept incremental risk less favorably than those adhering to more prudent practices. A company's demonstrated understanding of the risks undertaken also influences Standard & Poor's assessment. The amount of reinsurance. Standard & Poor's takes into account any use of reinsurance to support aggressive growth and reported capital strength, along with the expected timing of treaty recapture and the quality of assuming reinsurers.

Other contingent liabilities. Bond guarantees or similar contingent liabilities that may warrant a charge against capital are also considered. Although considerable attention is focused on risk-based capital ratios, Standard & Poor's assessment of capital adequacy is only one of many factors used in arriving at a company's financial strength rating. 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 insurer credit quality. Strength or weakness in other key areas, such as a company's management and corporate strategy, business profile, operating performance, liquidity, and financial flexibility, can more than offset relative strength or weakness in capital adequacy.

How Standard & Poor's Looks at Interest-Rate Risk In the 1990s, life insurers shifted from credit risk to option risk. This was partially because of the performance and liquidity issues for commercial mortgages that surfaced in the real estate downturn, and credit quality concerns brought on by a deterioration in credit of high-yield bonds. Another reason was that insurers were trying to maximize their NAIC risk-based capital ratio, which does not have an explicit charge for convexity (i.e., option risk). In fact, interest-rate risk has largely been ignored by the insurance industry, swept under the carpet of book-value accounting. Standard & Poor's risk-based capital model captures both asset and liability risks undertaken by life insurance companies. On the asset side, Standard & Poor's capital model has historically charged insurers for credit risk in their bond portfolios, underwriting risk for commercial mortgages and real estate, and market risk for stock equities. In 1994, Standard & Poor's began analyzing insurers' investment portfolios to look at the inherent convexity risk and has now more clearly defined its approach to this category of asset risk. In the model, capital is charged for potential credit defaults, based on Standard & Poor's credit default matrices, which show the probability of bonds defaulting. The charge provides a capital cushion for bond defaults. The capital required for option risk is allocated for potential interest-rate volatility. Clearly, some change in interest rates is inevitable over the average life of an investment. More important, the level of capital will be specific to a company's overall mortgage portfolio. Not all planned amortization class bonds and sequentials are the same; nor are all companies' risk appetites alike.

Methodology—Standard & Poor's Interest-Rate Risk Test The goal of this methodology is to extract the option risk in mortgage-backed securities by stressing interest rates and comparing them with 'A'

noncallable corporates under the same conditions. Standard & Poor's is looking to isolate the prepayment and extension risks of these assets, i.e., the unpredictability caused by rate swings that may or may not occur. It is assumed for purposes of this calculation that an insurer's assets are matched to its liabilities. This assumption is not made, however, across the overall rating process. The asset and liability management part of the rating process separately addresses the duration mismatch risk component and the asset and liability fit. Standard & Poor's methodology typically applies parallel rate swings of plus 300bp and minus 300bp to the mortgage-backed portfolio, although the magnitude of the shifts may vary from year to year, depending on year-end yield curves. For 2001, based on the position of the yield curve at year-end 2000, Standard & Poor's is using a scenario of plus 270bp and minus 200bp. Many companies already run this type of sensitivity analysis on their entire portfolios to comply with New York State's Regulation 126. Standard & Poor's is requiring insurers to model their mortgage-backed portfolios separately. The first part, and an important part, of the evaluation of the insurer's use of this asset class is the insurer's ability to model these assets. Standard & Poor's creates a synthetic asset from a basket of 'A'-rated noncallable corporate bonds, which is duration-matched to the effective duration of the company's mortgage-backed portfolio. This synthetic 'A' asset is then priced with the same parallel shifts in the yield curve, which are typically plus and minus 300bp. These results are compared with the mortgage-backed portfolio at the same levels to derive the level of capital needed. That is, the market value of the mortgage-backed portfolio at year-end plus 300bp is subtracted from the corresponding market value of the synthetic 'A' asset. The same equation is calculated for minus 300bp. The greater of these two numbers is used for the capital charge. As is the case in 2000, the magnitude of the shifts used in this calculation may vary from year to year, depending on year-end yield curves. For 2000, mortgage-backed securities risk capital needed is the greater of: 1) @ +270bp = ('A'-rated corporate portfolio (duration matched) - MBS portfolio) 2) @ -200bp = ('A'-rated corporate portfolio (duration matched) - MBS portfolio) Examples of mortgage-backed securities issued in 1997: 1. Pass-Through Duration-matched 'A' corporate versus a GNMA 7.00% coupon: Duration: 3.3 yrs. (midget) @ +270bp = (-10.9%) - (-13.7%) = 2.8% @ -200bp = (8.4%) - (4.4%) = 4.0% 4.0% 2. Pass-Through Duration-matched 'A' corporate versus a GNMA 7.00% coupon: Duration: 4.3 yrs. @ +270bp = (-14.0%) - (-17.3%) = 3.3% @ -200bp = (11.4%) - (6.0%) = 5.4% 5.4% 3. PAC CMO Duration-matched 'A' corporate versus a PAC 6.25% coupon: Duration: 3.2 yrs. @ +270bp = (-10.2%) - (-10.4%) = 0.2% @ -200bp = (5.5%) - (2.6%) = 2.9% 2.9% 4. Sequential Pay CMO Duration-matched 'A' corporate versus a SEQ 6.50% coupon: Duration: 2.5 yrs. @ +270bp = (-8.3%) - (-11.6%) = 3.3% @ -200bp = (6.7%) - (0.8%) = 5.9% 5.9% 5. Z-Bond Duration-matched 'A' corporate versus a Z-bond 7.00% coupon: Duration: 10.8 yrs. @ +270bp = (-29.1%) - (-37.3%) = 8.2% @ -200bp = (32.9%) - (13.5%) = 19.4% 19.4% This methodology does not require capital for changes in price of a vanilla bond as interest rates move. That is why Standard & Poor's is comparing the corporate changes in price, that is, one that Standard & Poor's can reasonably predict as interest rates move. The potential for rate swings and shortening or lengthening of mortgage-backed assets is why investors are paid additional spread relative to rating. Whether the performance of these assets exceeds those of a more predictable nature will depend on how much interest rates do move. For Standard & Poor's, the challenge has been quantifying these charges as they relate to different insurers' portfolios. As with credit risk, it may be possible for insurers to pass some of this risk to policyholders. However, Standard & Poor's believes the competitive environment limits an insurer's ability to do so. The relatively low level of interest rates may also limit insurers' ability to pass this risk along, because they may be bumping up against an acceptable lower threshold (5%). Standard & Poor's is looking for a capital cushion to offset this reinvestment risk. If the liability allows rates to reset, the cushion is to give insurers time to gradually lower crediting rates and not incur increased lapses. Whether partial hedges offset this capital charge is dependent on whether they make economic sense and whether they have been strategic and in place over time. For much of this asset class, the economics are not in hedging; in fact, over time an insurer might be better served in the 'A'-rated noncallable corporate. However, Standard & Poor's believes partial hedges are a valid asset class that help balance credit risk. In evaluating portfolios, Standard & Poor's is first and foremost looking for asset balance, i.e., not putting all of the eggs in one basket. To determine Standard & Poor's capital charge, the portfolio will be modeled in aggregate, thereby giving credit for assets that work well together. Standard & Poor's analysis focuses on the

overall portfolio effect. This is a different approach from the NAIC's flux, which looks at assets individually. It is important to look at the impact this charge has on Standard & Poor's view of the capital base, although this is not the sole determinant of how option risk may affect an insurer's rating, and mortgage-backed interest-rate risk is only one component of the overall financial strength rating process for insurance companies. Moreover, this risk must be considered in the context of each company's liability structure. The nature of the liabilities will help determine the relative extent to which the risk will likely be absorbed by either the insurer or policyholders. It will also put in a broader context whether an upward or downward change in interest rates will likely be more damaging to an insurer at any point in time. Standard & Poor's does believe a level of protection is needed for the variance in performance that can occur in this asset class. How Standard & Poor's Looks at an Insurance Company's Real Estate Portfolio Standard & Poor's looks at real estate in a variety of ways to determine its impact on the overall rating process. Equity real estate plays an important role in determining the quality and level of capital the insurer needs to support its liability structure. Moreover, a company's liquidity and earnings potential are also evaluated, at least in part, by reference to the management of real estate assets. Because of the real-estate market turnaround in the late 1990s, companies no longer need to offer large up-front tenant enhancement practices, such as lease incentives and custom designs, which in the past have hurt bottom-line results. Note that equity real estate is given no asset credit in Standard & Poor's liquidity model, which measures an insurer's ability to pay claims under severe liability surrender and withdrawal scenarios. Chart 1 summarizes the methodology used to value an insurance company's equity real estate portfolio, which will determine the charges used in Standard & Poor's capital adequacy model. The following explanations are numbered to match the chart: 1) Home office properties: These properties are not included in the analysis. 2) Unimproved land: If the asset yield is greater than the minimum target yield, it is analyzed by the same method as other properties. If the asset yield is lower than the minimum target yield, there is a fixed charge of 2x the base charge. A fixed charge of either 30% or 50% is applied for the ongoing or liquidation reserve, respectively. 3) Unseasoned office properties: These are properties built or redeveloped in the past three years. If the adjusted net operating income from such properties produces the minimum target yield, they are analyzed in the same fashion as other properties. If not, a fixed charge of either 25% or 35% for the ongoing or liquidation reserve, respectively, is applied. 4) Foreclosure: Properties that are in the process of foreclosure are not included in the analysis. 5) Acquired by foreclosure: If the property was acquired in the past 12 months, a fixed charge of either 15% or 21% for the ongoing or liquidation reserve, respectively, is applied. Otherwise, the property is valued in the same fashion as other properties. 6) Ongoing or liquidation: The analysis assumes that an ongoing business can sustain a lower return than a liquidation program. An ongoing program will benefit from cyclical recovery in the property markets, whereas a liquidation effort will incur the costs of the current unfavorable property market and the need to sell many properties. 7) Target yield: Treasury bond plus spread (ongoing). The ongoing target yield represents the minimum sustainable yield on an office property. Office properties are used as the benchmark because the industry's holdings are concentrated in that sector. 8) Target yield: Treasury bond plus spread (liquidation). Liquidation target yield represents the minimum yield required to sell an office property quickly. 9) Adjust target yield by property type: Target yields are adjusted for nonoffice properties to reflect market conditions by property type. 10) Adjust net operating income for debt service: partial years. For leveraged properties add debt service payments to reported income and evaluate the property on an unleveraged basis. For investment properties that have been owned less than a year, annualize income on a straight-line basis and evaluate property using annualized income. For foreclosed properties owned less than a year, calculate ongoing reserves with a 15% charge, and liquidation reserve with a 21% charge. 11) Target value equals net operating income/target yield: On a property-by-property basis, target yield is calculated by capitalizing the property's most recent net income at the adjusted target yield. In real estate terms, the target yield is the property's cap rate, which is equal to net cash flow divided by price. 12) Adjust target value by market statistics: Real estate markets are ranked according to supply and demand data generated by F.W. Dodge. If a property's market is strong or very strong, target value is increased 10% to 20%, respectively. If the market is weak or very weak, values are reduced 10% or 20%, respectively. 13) Property's net area available: Maximum and minimum valuations are computed

as described in 14 and 15 below, if a property's square footage (or, for apartments or hotels, number of units) is available. 14) Constrain target value by maximum and minimum valuations: If net area is available, valuation is constrained by maximum and minimum values per square foot or unit, based on existing market conditions. Liquidation basis will be 20% less than ongoing basis. Maximum value is further limited in that no property will be valued in excess of its book value unless its yield exceeds the target market yield plus 50bp. 15) Constrain target value: Minimum equals one-third of book cost. If net area is not available, minimum valuation is set at one-third of book cost. As in 14, maximum value is limited in that no property will be valued in excess of book value unless its yield exceeds the target market yield plus 250bp. The maximum valuation is constrained to 1.5x cost. 16) Answer = Target value as adjusted: Each property's value is estimated according to steps 1 to 15. Additional reserves (if any) may be added at the analyst's discretion. Large subsidiary/affiliate capital charge (see Standard & Poor's Refines Its Methodology for Analyzing Insurance Groups, published Feb. 24, 2000). If large subsidiaries/affiliates represent more than 10% of total adjusted capital (TAC) and are viewed as nonstrategic in Standard & Poor's group ratings methodology, Standard & Poor's will apply its equity volatility charge (as applicable in that market) plus a 15% concentration charge on the total subsidiary investment in a capital model. In the U.S., this means the charge will be 15% equity volatility charge plus 15% concentration charge, equaling a 30% charge on the entire investment in the subsidiary/affiliate. Note that this total charge is a minimum charge, and that the analyst can increase the charge if it is believed either that there is greater than normal volatility in the subsidiary holding, or that the holding is overvalued, or the holding is expected to significantly devalue. Capital Credit for Subsidiaries with Publicly Traded Minority Interests As a result of several insurers recently deciding to partially spin off subsidiaries, Standard & Poor's has adopted an approach for capital credit for subsidiaries and strategic affiliations with publicly traded minority interests. This approach will apply to subsidiaries and affiliates that are considered core or strategically important according to Standard & Poor's group ratings criteria. Subsidiaries and affiliates considered nonstrategic under Standard & Poor's group ratings criteria are excluded. Those companies that are considered nonstrategic and that have publicly traded minority interests will be included at full market value, just as any other equity investment would be. These investments would be subject to Standard & Poor's capital charge for market volatility (typically 15% globally) and would be subject to Standard & Poor's concentration risk charges if the investment represented more than 15% of group capital. Standard & Poor's permits capital credit to be given in any group capital model under the following guidelines: Capital credit for the market value of a subsidiary or strategic affiliate can only be given if there is a public valuation of shares of the subsidiary. There must be sufficient outstanding shares to constitute a liquid market for the stock with a credible share price (that is, there are a sufficient number of bids or offers to develop a market price). Capital credit for the excess of market value over book value of the subsidiary or strategic affiliate will not exceed credit given by the regulators in the jurisdiction of the parent insurer's domicile (this applies only if regulatory capital guidelines exist). Capital credit for the excess of market value over book value of the subsidiary or strategic affiliate will not exceed 25% of the difference between market value over book value. Capital credit for the excess of market value over book value of the subsidiary or strategic affiliate will not exceed 10% of TAC (including this capital credit) in the group capital model. Chart 1