STANDARD & POOR'S

FULL ANALYSIS

Massachusetts Mutual Life Insurance Co. And Subsidiaries

Operating Companies Covered By This Report

Financial Strength Rating

Local Currency
AA+/Stable/—

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Major Rating Factors

Strengths:

- Very strong competitive position with strong market positions in individual life insurance, retirement plans, and asset management.
- Very strong operating performance.
- Very strong capitalization.
- Very well-developed asset/liability management.
- Benefits of mutual corporate governance structure.

Weaknesses:

- Capital adequacy declined because of equity market volatility and higher actual and expected investment losses and impairments.
- Limited access to financial markets to raise capital.
- Highly competitive key markets and difficulties in maintaining a strong position across life insurance markets.
- Challenges consistent with the industry to attract and retain agents and improve agent productivity.

Rationale

The insurer financial strength ratings on Massachusetts Mutual Life Insurance Co. and its U.S. insurance subsidiaries (collectively referred to as MassMutual) are based on the company's very strong competitive position and capitalization. The ratings also reflect the company's very strong operating performance and asset/liability management (ALM), as well as the benefits it derives from its mutual ownership structure. Partially offsetting these strengths are the competition MassMutual faces in its key markets, its lower quality of capital, and its reduced financial flexibility. In addition, MassMutual's business profile and competitive advantages, though among the strongest in the industry, are more consistent with those of 'AA+' rated peers.On Aug. 26, 2009, Standard & Poor's Ratings Services lowered its counterparty credit and financial strength ratings on Massachusetts Mutual Life Insurance Co. and its U.S. insurance subsidiaries, C.M. Life Insurance Co. (C.M. Life) and MML Bay State Life Insurance Co. (MML Bay State), to 'AA+' from 'AAA' and assigned a stable outlook. (For more details, see " Massachusetts Mutual Life Insurance Co. And U.S. Insurance Affiliates Ratings Lowered To 'AA+'; Outlook Is Stable," published on RatingsDirect.)MassMutual's capitalization is very strong and supportive of the ratings, with statutory total adjusted capital of $9.5 billion at year-end 2008. MassMutual derives a very material portion of its analytically adjusted capital base (approximately 30%) from the more volatile value of its asset management subsidiaries (including OppenheimerFunds Inc., Babson Capital Management LLC, Baring Asset Management Ltd., and Cornerstone Real Estate Advisers LLC) instead of from more readily realizable and liquid financial assets that more easily absorb enterprise risks. This weakens the company's quality of capital. Consequently, we view MassMutual's quality of capital as very strong but weaker than our quantitative model indicates, which measures a modest redundancy of capital at the extremely strong 'AAA' confidence level. Our capital adequacy analysis reflects our incremental stress factors (see " Methodology For Incorporating Incremental Stress Factors Into The Capital Adequacy Analysis Of North American Insurers," published Feb. 18, 2009, on RatingsDirect).The stability and strength of MassMutual's business profile is very strong. The company continues to build momentum within its agency distribution system, which has helped improve the company's market share to No. 3 for whole life insurance, its core product, despite the significant economic turmoil. MassMutual also maintains a diversified array of other insurance, asset management, and international ventures that enable it to meet a broad set of its clients' needs. However, the strength of MassMutual's diversified operations is more consistent with similarly rated peers' than it is with that of more highly rated peers.MassMutual has a very strong competitive position and leads peers in several product lines: individual life insurance, individual disability insurance (DI), annuities, long-term care insurance, retirement plans, and asset management through the ownership of OppenheimerFunds and other asset managers. Scale is one element of MassMutual's efficient operations, with total assets under management (AUM) experiencing double-digit growth annually from 2003 to year-end 2007, when AUM reached $505 billion. Because of recent market volatility, AUM declined more than 28% to $363 billion at year-end 2008 but increased to $373 billion as of June 30, 2009.We expect MassMutual's operating performance to remain very strong and supportive of the ratings. However, the level and volatility of its operating performance weigh more heavily on the ratings now because capitalization has weakened from much more highly redundant levels. MassMutual's earnings have more sensitivity than peers' to the equity markets and asset-based fee income through its investment management affiliates and variable annuity business.MassMutual maintains very strong and well-diversified earnings, including its U.S. life insurance operations, asset management subsidiaries, and international ventures. Because of earnings diversification, the company continues to generate consistent underlying insurance operating results with strong fundamentals, including competitive spreads, active expense management, and favorable morbidity and mortality. In full-year 2008, MassMutual reported a loss in statutory net income of $1.1 billion, compared with a net gain in 2007 of $201 million. The decline resulted primarily from increased investment losses and additional cash-flow testing reserves for variable annuity liabilities.MassMutual's very strong financial flexibility has weakened as a result of the economic downturn and because financial leverage increased in June 2009 (after the company issued $750 million of surplus notes) to the maximum tolerance for capitalization at higher ratings. The company's remaining sources of financial flexibility are limited but include financing its XXX and AXXX redundant reserves and potentially selling certain affiliated operations. Many of these options have uncertain execution time frames, and it is more difficult to ensure execution and to realize maximum value during an economic downturn and when capital markets are less liquid, which they currently are. Market conditions also have depressed the substantial unrealized appreciation of MassMutual's asset management subsidiaries, making it less likely that attractive opportunities to monetize any portion of these assets would emerge prior to a substantial market recovery.The company's ALM and investment performance are very strong, and its invested assets are well diversified. It engages in extensive cash-flow testing to ensure correctly matched assets and liabilities. At the same time, as a mutual company, MassMutual has the option to decrease policyholder dividends to adjust for unexpected negative developments over the medium to longer term.Investment quality is solid because of the lack of concentration in any issuer or investment class and because of the high-quality fixed-income portfolio. The company does have sizable subprime/Alternative-A (Alt-A) exposure, although its excess capital should comfortably absorb potential losses.We expect MassMutual's liquidity to remain ample for the company's risk profile and the ratings. Its 2008 liquidity ratio declined to 220%, which is supportive of the ratings but below our expectation that the ratio would remain at about 230% at year-end. Because of the difficult economic conditions and increased unrealized investment losses, its liquidity ratio could decline further during 2009, but we expect it to remain at more than 200%. Although liquidity is primarily a pass/fail metric, the erosion of MassMutual's liquidity ratio is symptomatic of a stressed economy that eroded asset liquidity.MassMutual maintains strong liquidity, with a liquidity ratio of 220%, which supports the rating. MassMutual's stress testing of liquidity follows strict guidelines, which Standard & Poor's views as conservative. Invested assets are well diversified in highly liquid asset classes, and the portfolio's liquidity far exceeds the company's liquid liabilities.

Outlook

The outlook is stable and reflects our expectation that MassMutual will continue to build momentum in its whole life business and that it is well positioned to maintain its current capitalization levels through the economic downturn.We expect individual insurance sales of whole life in the career agency channel to increase in 2009 from 2008 levels and exceed the growth rate of most peers'. We expect overall individual annuity sales to remain below prior levels in this highly competitive market, both to conserve capital and to manage the mix of business and overall risk profile. Growth in AUM will reflect equity market trends in the company's retirement services and asset management businesses.MassMutual's financial performance will remain very strong. MassMutual's investment portfolio, both in asset allocation and hedging strategy, is unlikely to change significantly. We expect the company to maintain very strong capitalization that is quantitatively redundant at 'AAA' confidence levels through core earnings, risk reduction, and other management actions. We expect liquidity to remain strong because of MassMutual's investment strategy and liability profile. The company's liquidity ratio likely will be more than 200% at year-end 2009.

Competitive Position: Emphasizing Its Agency Force And Working To Regain Market Share And Production Levels

MassMutual maintains a very strong competitive position because of its diversified revenue sources and its position as one of the leading issuers in the traditional whole life insurance market. The company continues to reemphasize its commitment to its increasingly efficient career agency distribution force for the sale of life insurance products and especially traditional whole life, and agent productivity has improved consistently since 1998. MassMutual's ability to provide a complete spectrum of both traditional and nontraditional products, as well as fixed and variable products, gives it a diverse portfolio, which is an advantage during unstable market conditions.MassMutual is increasingly focused on enhancing its career agency channel to distribute its life insurance products, and we believe the company has the potential to further improve agent productivity and retention. That said, MassMutual has yet to regain overall sales levels and market share that it achieved prior to the rededication of its efforts primarily to its career channel. MassMutual has deemphasized sales of insurance products through third parties, which now account for a small fraction of overall production. Given management's aggressive plans for growth in the captive channel, Standard & Poor's expects MassMutual ultimately to continue to increase its share of the individual life insurance market once the effects of the pullback from third-party distributed universal life insurance subside.Although MassMutual had invested in additional distribution methods, the career agency force remained its centerpiece. In the past two years, the company's four-year agent retention rate has improved by more than one-third and now exceeds the industry average**.** The retention rate is improving because of increased efforts in recruiting and improved marketing support. Although we expect the renewed focus on the career agency channel through enhanced technology, agency development, and client-building programs to improve retention, sustaining an improved retention ratio will remain a challenge given the competition in the agent channel and the industry tendency for agents to be attracted to brokerage houses.MassMutual and its affiliates consist of three major segments: domestic insurance, asset management, and international.

Table 1

MassMutual Insurance Group/Selected Statistics

	—Year ended Dec. 31—				
(Mil. $)	***2008***	***2007***	***2006***	***2005***	***2004***
Capital adequacy ratio (%)	AAA	AAA	AAA	498.8	383.8
Liquidity ratio (%)	219.9	223.5	224.2	239.3	244.6
Total assets (including separate accounts)	125,110.6	131,557.0	122,179.6	113,586.4	108,886.2
Total premiums and considerations	14,061.9	13,423.5	13,198.0	12,707.5	14,285.6
Pretax income	(20.2)	834.8	562.8	689.7	386.0
Total adjusted capital (including asset valuation reserve)	9,547.7	10,294.4	9,428.0	8,787.0	8,644.5

Table 2

MassMutual Insurance Group/Business Statistics

	—Year ended Dec. 31—				
(Mil. $)	**2008**	**2007**	**2006**	**2005**	**2004**
Total revenue	19,676.9	18,996.8	18,246.6	17,585.8	18,943.8
Total premiums and considerations	14,061.9	13,423.5	13,198.0	12,707.5	14,285.6
Premium revenue increase (%)	4.8	1.7	3.9	(11.0)	4.9
Deposits	1,239.4	2,327.5	1,132.5	698.4	1,867.5
Total premiums, considerations, and deposits	15,301.3	15,751.0	14,330.5	13,405.9	16,153.1
Premiums, consideration, and deposit revenue increase (%)	(2.9)	9.9	6.9	(17.0)	18.6
Net first-year premiums	4,236.9	4,147.0	4,104.0	2,264.3	3,488.7
Net first-year increase (%)	2.2	1.0	81.2	(35.1)	(1.6)
Net single premiums	1,653.0	1,185.5	1,467.6	1,082.6	1,644.2
Net single increase (%)	39.4	(19.2)	35.6	(34.2)	34.0
Separate accounts assets	36,476.6	50,226.9	45,568.9	40,227.1	37,102.3
Increase in separate accounts assets (%)	(27.4)	10.2	13.3	8.4	22.3
Major lines					
Individual life	3,992.8	3,902.0	3,819.7	3,529.1	3,644.7
Individual annuities	3,187.5	2,134.2	2,156.7	1,993.0	2,860.9
Group life	265.8	880.8	729.0	457.5	810.0
Group annuities	6,157.3	6,065.7	6,065.3	6,316.0	6,576.0
Individual accident and health	458.6	440.8	427.2	411.9	394.0
Deposits	1,239.4	2,327.5	1,132.5	698.4	1,867.5

Domestic insurance

Domestic insurance includes life, disability/long-term care, executive benefits, retirement services, annuities, and financial products. Of the total $363 billion of AUM in 2008, domestic insurance constituted 34% of AUM and more than three-quarters of the company's total premiums in 2008.Life insurance sales fell by 8% in 2008 and 11% in the first half of 2009. This drop in sales resulted from MassMutual's intentional pullback from its independent distribution, which Standard & Poor's views favorably with the potential to improve career channels retention and productivity, as well as from the industrywide decline in life insurance sales resulting from the economic uncertainty. MassMutual increased its periodic recurring premium and weighted premiums from whole life insurance sales by more than 15% in 2008, well ahead of the industry average of a few percent, and captured the No. 3 market position for weighted whole life sales. As of June 2009, the company also captured the No. 3 market position for recurring premium sales. The company continues to focus primarily on providing life insurance to mid- to upper-middle-income individuals (household income greater than $75,000) as well as to small to midsize businesses. MassMutual has a strong market position in the high-net-worth market.The 2008 weighted life insurance sales mix is predominantly whole life (65%) as well universal life (20%), term life (12%), and variable universal life (3%). By comparison, industry weighted life insurance sales in 2008 were whole life (19%), universal life (42%), term life (23%), and variable universal life (15%).Subsidiaries C.M. Life and MML Bay State provide some variable and universal life products. The financial strength ratings on these entities reflect explicit support from MassMutual.

MML Investors Services Inc. is the broker-dealer for MassMutual's career agency force. It provides a full complement of securities products, including proprietary and nonproprietary mutual funds and variable life insurance and annuity products.MassMutual provides individual disability and long-term care insurance, primarily through career agency distribution. The 19% increase in disability income sales in 2008 was facilitated by MassMutual's eWorksite Solutions offering, which supports product education and sales in the workplace.Recently, the company began to focus more on selling individual annuities. MassMutual continues to introduce new fixed- and variable-annuity products to bring its portfolio up to date and has enhanced existing products with new funds. Shortly after the markets began their steep decline, MassMutual withdrew its most enhanced guarantee benefit riders from the market to help constrain risk.In 2008, annuity sales increased 48% to $2.9 billion. Although MassMutual is not a market leader in this product line, the sales volumes are considerable and provide a degree of diversification to sales and earnings.Sales for retirement services, which focuses on providing full-service, defined-contribution, and defined-benefit retirement plans ranging from small to midsize businesses, increased 2.4% in 2008 after rebounding strongly in 2007 from 2006 because of favorable market conditions and the effect of registered products. Its main competitive advantage is leveraging its defined contribution technology platform through more than one million plan participants. MassMutual maintains a top-tier life insurer market share position in the defined contribution market. To further bolster its position, in 2008 MassMutual purchased First Mercantile Trust Co., with $4.6 billion of AUM.

Asset management

Of the total $373 billion of AUM as of June 30, 2009, asset management (excluding amounts managed for MassMutual) constituted 58%. This segment consists of four asset managers: OppenheimerFunds Inc., Babson Capital Management LLC, Baring Asset Management Ltd., and Cornerstone Real Estate Advisers LLC. MassMutual owns almost 100% of Oppenheimer, which has more than 60 mutual fund offerings and $139 billion in AUM as of June 30, 2009. Oppenheimer has a strong distribution network and above-average investment performance relative to the industry. The company has significant brand recognition and continues to exploit the cross-selling opportunities with MassMutual. Standard & Poor's believes that the enterprise value of Oppenheimer, Babson, and Baring is greater than the statutory book value recorded of $2.2 billion because of its above-average earnings power and acknowledged brand. We consider this excess value a favorable resource for MassMutual, and, in our capital model, we increase total adjusted capital to reflect some of this value. However, during periods of systemic economic stress, the ability of this asset to support insurance risks is more limited and contributes to a more cautious view of the quality of capital.

International

MassMutual has a diverse international business that has expanded rapidly as a result of strong niche positions in certain Asian products and markets. This segment is viewed primarily as a strategic investment, and, at its current scale, it doesn't provide substantial benefit to MassMutual's financial strength. The international segment contributes good earnings to the group and provides only modest diversification of earnings. Of the total $373 billion of AUM, international constituted only 6%.

MassMutual has been expanding steadily in Asia, where some of the company's largest international subsidiaries are based, and it maintains an opportunistic interest in the region.

MassMutual Mercuries Life Insurance Co. Ltd. is the largest foreign insurer in Taiwan, which had about $10 billion of AUM as of June 30, 2009. In February 2004, MassMutual acquired Fuh Hwa Securities Investment Trust Co., the fourth-largest mutual fund company in Taiwan. In early 2008, MassMutual announced the sale of its direct investment in Fuh Hwa Securities but indirectly maintains a small minority interest through MassMutual Mercuries Life Insurance Co. Ltd.

MassMutual Life Insurance Co. of Japan (MassMutual Japan) has posted strong growth as a result of a strong competitive niche in the sale of corporate-owned life insurance (COLI) and single-premiums, fixed-annuity products. However, its performance history is relatively short in Japan, which is highly competitive, especially for non-U.S. companies. MassMutual Japan has expanded its distribution significantly to include more financial institutions, banks, brokers, and financial planners.

MassMutual is established in Hong Kong through MassMutual Asia Ltd. (MassMutual Asia), the sixth-largest insurer in Hong Kong, which had AUM exceeding $1.4 billion as of June 30, 2009. In February 2004, MassMutual Asia and Oppenheimer formed an alliance to offer mutual funds in this market. Standard & Poor's expects MassMutual Asia to continue to expand services aggressively in Hong Kong because of both the demographics of Hong Kong and the access it provides to mainland China. The company also has a small minority investment of about $60 million in an insurance company in Chile.

Management And Corporate Strategy: Strong Management Execution And Well-Developed ALM Breed Success

MassMutual has successfully executed its strategy of diversifying sources of earnings and distribution sources while maintaining economies of scale by pursuing specific markets. Thus far, Standard & Poor's believes management has achieved enhanced results without assuming a significant amount of additional risk. This success has been attributed to strong execution by management and well-developed ALM.

MassMutual's board of directors named Roger W. Crandall CEO, effective Jan. 1, 2010, to succeed Stuart H. Reese, who will step down from that position and assume the role of nonexecutive chairman of the board. We believe that the company has demonstrated effective succession planning and that it will maintain its general strategic direction following this and related planned executive management changes, ensuring the continued stability of its operations.

The ratings reflect the successful leveraging of the company's mutual ownership. Because of this structure, it can build its very strong capital base through the development of strong statutory earnings, and it can selectively enhance its well-diversified business profile through modest strategic acquisitions and by developing businesses in the longer term.

Operational management

Management continues to transform MassMutual into a more diversified organization, in terms of product offerings and earnings sources, while producing strong growth in sales and earnings and maintaining very strong capitalization. The implementation of this strategy is evident in the number of new and enhanced product offerings developed, the enhanced focus on the career agency force related to agent retention and productivity, and the company's international expansion efforts.

Financial management

Similar to its large mutual peers, MassMutual has scale and focuses on efficiency. It differentiates itself from public competitors by returning all profits to policyholders or building capital for its security rather than to provide returns to shareholders. We view this as a competitive differentiator at the current ratings level. The company has overcome a traditional disadvantage associated with mutual insurers by accessing the capital markets through the issuance of surplus notes and commercial paper, which has enhanced capitalization and financial flexibility. However, these measures still are not comparable to those of strong public companies. MassMutual's financial management focuses on premium growth, AUM, and operating earnings, both on a statutory and management basis. In addition, the company is committed to maintaining capitalization supportive of the ratings and a well-diversified investment portfolio.

Enterprise Risk Management: Adequate, With Solid Management Of Its Investment Risks

MassMutual has an adequate enterprise risk management (ERM) program that supports the financial strength rating. We view several aspects of the company's ERM as strong. MassMutual's largest risks are investment related, and Standard & Poor's views the company's controls of those risks as strong and well managed. We believe that these strong risk controls mean it is unlikely the company will experience losses outside its tolerances. The company has experienced lower-than-average earnings volatility, which is further evidence of the good risk control. However, MassMutual has several processes of varying sophistication to identify and evaluate risk/reward trade-offs and to manage risk-adjusted returns. In some cases, the company relies on a risk-based capital (RBC) formula analysis of risks rather than a risk model that is calibrated to specific risks. We believe ERM is moderately important to the rating on MassMutual because of the diverse businesses within the group in the U.S. and internationally, offset by the company's conservative risk appetite, participating business, and generally strong operating earnings (before realized gains and losses) and very strong capitalization that provide capacity to absorb losses. We believe that MassMutual's ERM program is stable. We do not expect to see significant ERM program changes in the next two years.

The company's risk-management culture has been under development for the past several years. The insurer first appointed a chief risk officer in 2003 and has since expanded the number of committees that oversee risk and risk-management activities. This idea that risk management needs to identify opportunities as well as risks is ingrained into the charter of the risk-management function.

Risk-management practices at MassMutual are most robust in the investment area. The firm shows a very high degree of dedication to diversification, with very low single-name limits and a wide variety of investment vehicles in use. MassMutual shows a very high orientation toward action, with a focus on acting when it sees a significant change (both upside and downside) in the return for the amount of risk for any investment situation. MassMutual has a strong track record of credit risk management. In the area of ALM, the company targets a very low exposure to interest rate risk and acts decisively to maintain that target.

In the area of strategic risk management, MassMutual has articulated a goal of managing its business risks in a portfolio manner similarly to its management of an investment portfolio, recognizing the risks and rewards of activities, as well as their contribution to aggregate risk and reward. However, the company currently supports such work primarily with an RBC-type generic view of risk, augmented by stress testing. Standard & Poor's finds it favorable that MassMutual uses risk-adjusted return targets for its products, but it's less favorable that these targets are primarily subjectively determined. In addition, MassMutual's broad commitment to diversification does not seem to be tied to any specific quantitative and systematic view of the impact of diversification on its risk profile, which would be an important component of portfolio risk/reward optimization.

Accounting

Standard & Poor's believes that MassMutual's accounting is consistent and adequate. The company prepares its public financial statements on the basis of U.S. statutory accounting principles. MassMutual also prepares nonpublic and unaudited financial statements for certain business segments reflective of generally accepted accounting practices, which we may also use in our analysis.

KPMG audited MassMutual's statutory statements for the past several years and has provided an unqualified opinion on the financial statements and footnotes. The insurance operations, subsidiaries, and affiliates prepare statutory filings in compliance with the various insurance regulatory authorities. The companies have made all filings within the prescribed time frame.

For the purpose of evaluating MassMutual's capitalization, we make a risk-adjusted capital credit for its affiliated holding in Oppenheimer Funds and other asset managers to partially recognize an estimated excess of market value over book value. Consequently, the value of the asset managers comprises more than 30% of Standard & Poor's calculation of risk-adjusted capital.

From a statutory accounting standpoint, the increase/decrease in the value of the derivatives used to hedge its interest rate risk directly affects statutory surplus. The corresponding economic offset is embedded in the assets and liabilities. From an accounting standpoint, interest rate-related assets and liabilities targeted for hedging are not marked to market on an ongoing basis. Although assets and liabilities are not adjusted, the change in the mark-to-market derivative valuation basis runs through surplus. Standard & Poor's considers this risk-management technique as very favorable given the uncertainty and volatility related to interest rate risk.

We believe that the group maintains good discipline in financial reporting. Although not an SEC registrant and therefore not required, the company received a clean internal controls opinion, in conjunction with Sarbanes-Oxley 404 compliance, from its independent public accountants for its 2006 statutory financial statements. Furthermore, the company has chosen to voluntarily implement quarterly financial reporting control procedures like those required by Section 302 of the Sarbanes-Oxley Act of 2002, which we view favorably.

Operating Performance: Underlying Operating Performance Remains Very Strong Despite Equity And Credit Market Volatility

MassMutual maintains very strong and well-diversified earnings. Because of earnings diversification, the company continues to generate consistent underlying insurance operating results with strong fundamentals, including competitive spreads, active expense management, and favorable morbidity and mortality. In full-year 2008, statutory net income showed a loss of $1.1 billion compared with a net gain in 2007 of $201 million. The sharply lower net income results include the effect of equity market volatility that reduced asset-based fee income, increased cash-flow testing reserves for variable annuity liabilities, and realized investment losses, including impairments. However, we expect the group's capitalization to be able to absorb these shocks within expectations for the ratings.

Table 3

MassMutual Insurance Group/Summary Operating Statistics

	—Year ended Dec. 31—				
(Mil. $)	***2008***	***2007***	***2006***	***2005***	***2004***
Pretax income	(20.2)	834.8	562.8	689.7	386.0
Net income	(1,060.4)	236.5	858.7	799.6	368.6
Return on revenue (%)	(0.10)	4.39	3.08	3.92	2.04
Return on assets (%)	(0.02)	0.66	0.48	0.62	0.37
Pretax statutory rate of return on capital (%)	N.A.	N.A.	5.05	12.70	6.85

N.A.—Not available.

Table 4

MassMutual Insurance Group/Operating Statistics

	—Year ended Dec. 31—				
(Mil. $)	***2008***	***2007***	***2006***	***2005***	***2004***
General expenses	1,099.6	1,140.8	1,176.8	1,012.3	1,262.0
General expense ratio (%)	7.1	7.2	8.3	7.7	7.9
Expense ratio (%)	10.5	10.4	11.8	11.4	11.2
Unit expenses (in whole dollars)	405.9	394.3	406.4	333.2	437.2
General expenses as a percentage of total assets	0.9	0.9	1.0	0.9	1.2
Commission ratio (%)	5.7	6.3	6.6	7.0	7.2
Lapse ratio (ordinary only) (%)	5.2	4.5	4.7	5.1	5.1
Mortality ratio (%)	255.9	266.0	252.7	248.4	271.3
Investment spread (%)	2.7	2.8	2.7	2.8	2.7
Accident and health					
Loss ratio (%)	67.5	71.3	76.8	88.1	80.4
Expense ratio (%)	44.3	46.1	46.9	48.8	47.8
Combined ratio (%)	111.7	117.5	123.7	137.0	128.2

MassMutual's 2008 lapse ratio of 5.2% is one of the lowest in the industry, reflecting a combination of its loyal career distribution system and competitive products.

We expect MassMutual's underlying operating performance to remain very strong and supportive of the ratings. However, the level and volatility of its operating performance weigh more heavily on the ratings now because capitalization has weakened from much more highly redundant levels. MassMutual's earnings have more sensitivity than peers' to the equity markets and asset-based fee income through its investment management affiliates and variable annuity business.

Investments And Liquidity: Strong Credit Investment Management, With Incremental Risks Taken On Excess Capital Position

Standard & Poor's views MassMutual's investment management as very strong because of the company's ability to handle the downturn in the credit markets, maintaining high-quality investments in its portfolio, ALM, and an effective hedging strategy.

Anticipating the credit downturn and leveraged buyout risk, MassMutual made a strategic decision to incrementally take on more Alt-A investments. The decision itself added, rather than reduced, risk. But, the discipline that the company employed in exercising this decision somewhat mitigates the amount of expected losses. MassMutual limited its exposure to within capital tolerance levels.

Table 5

MassMutual Insurance Group/Investment Statistics

	—Year ended Dec. 31—				
(Mil. $)	***2008***	***2007***	***2006***	***2005***	***2004***
Net investment income	5,208.3	4,998.2	4,563.7	4,377.1	4,069.8
Total invested assets	86,217.8	79,101.2	74,531.9	71,413.9	69,817.6
Net realized capital gains	(1,299.3)	(455.0)	254.1	212.8	137.9
Asset risk to invested assets (%)	N.A.	N.A.	12.3	5.1	5.3
High-risk assets to total invested assets (%)	12.9	15.0	14.8	13.6	11.9
Net investment yield (%)	6.30	6.51	6.25	6.20	6.03
Five-year realized capital gains to invested assets (%)	0.16	0.32	0.29	0.22	0.19
Portfolio composition					
Cash, cash equivalents, and short-term investments (%)	3.5	3.3	1.4	1.5	1.5
Bonds (%)	44.1	39.0	40.1	40.6	44.6
Mortgage-backed securities (%)	12.3	16.2	18.9	17.1	15.7
Mortgages (%)	15.1	16.0	14.9	13.3	13.8
Policy loans (%)	10.6	10.8	10.8	10.5	10.2
Stocks (%)	2.2	4.8	5.6	5.2	4.8
Real estate (%)	1.3	1.5	1.7	1.8	2.1
Other (%)	10.8	8.4	6.7	10.0	7.3

N.A.—Not available.

Table 6

MassMutual Insurance Group/Liquidity And Reserves Statistics

	—Year ended Dec. 31—				
(Mil. $)	***2008***	***2007***	***2006***	***2005***	***2004***
Allocation of reserves					
Individual life	50.2	50.3	49.6	48.0	47.3
Group life	14.4	14.4	14.1	14.0	13.3
Individual annuities	9.8	9.5	10.3	10.0	9.6
Group annuities (including guaranteed investment contracts)	17.5	18.4	18.5	20.1	21.9
Accident and health	3.4	3.5	3.6	3.5	3.5
Other	4.7	3.8	4.0	4.3	4.5
Liquidity ratio (%)	219.9	223.5	224.2	239.3	244.6
Surrenderable annuities to total reserves (%)	13.5	11.2	N.A.	N.A.	N.A.
Liquid assets to total assets (%)	46.8	45.6	45.9	N.A.	N.A.

N.A.—Not available.

Investment quality is solid because of the lack of concentration in any issuer or investment class and because of the high-quality, fixed-income portfolio. The company does have sizable subprime/Alt-A exposure that is below the industry average but above the levels of its large mutual peers.

As of Dec. 31, 2008, MassMutual's cash and invested assets consisted primarily of corporate public and private bonds (37%); cash, short-term investments, and treasuries (11%); mortgage-backed securities (MBS) (12%); mortgages (15%); policy loans (11%); equity stocks and real estate (3%); and other (11%).

MassMutual practices strong ALM. It places particular emphasis on managing liabilities with higher interest rate sensitivity. The company manages each liability segment separately. Periodic scenario testing confirms that assets and liabilities are closely matched. Overall, Standard & Poor's believes the management of this risk is appropriate, given the nature of the liabilities.

The company maintains an active hedging strategy to hedge its exposure to interest rates on both assets and liabilities. Asset risks arise from MBS prepayment options and call provisions on bonds. Liability risks arise from floor interest rate guarantees and book value surrenders on the liabilities.

The company offsets these risks by purchasing financial interest rate option contracts, such as call and put options and caps and floors. This strategy adjusts the duration of the asset portfolio to match liability target duration. Convexity is hedged.

To help maximize yields, MassMutual invests in private placements, which constituted about 30% of the bond portfolio at year-end 2008. The portfolio is internally monitored, conservatively managed, and has performed well. We expect this to continue. Within the MBS portfolio, MassMutual has only a nominal amount of the riskier security types, and overall it has only moderate interest rate risk.

The commercial mortgage portfolio, with an average loan size of about $19 million, is well diversified in both building type and geographic location. The company uses its in-house investment capability to manage these assets.

MassMutual's liquidity remains strong. Invested assets are well diversified in highly liquid asset classes, and the portfolio far exceeds the company's liquid liabilities. Investment quality is solid because of the lack of concentration in any issuer or investment class and because of the relatively high quality of the fixed-income portfolio.

MassMutual's stress testing of liquidity follows strict guidelines, which we consider conservative. As of year-end 2008, MassMutual had a strong liquidity ratio of about 220%, based on Standard & Poor's liquidity model. The company's investment portfolio contains a substantial amount of highly liquid assets, given its allocation in favor of investment-grade, publicly traded bonds, as well as its limited use of more illiquid mortgages and real estate.

Capitalization: Quality Of Capital Reduced By The Volatile Value Of Asset Managers

MassMutual's capitalization is very strong and supportive of the ratings, with statutory total adjusted capital of $9.5 billion at year-end 2008. The quality of capital is very strong, given the strong statutory earnings profile, the value of the company's affiliated asset management holdings, and the active hedging strategy that mostly immunizes the company from interest rate risk volatility. We expect MassMutual's excess capital to comfortably absorb the potential losses on its subprime/Alt-A investments in addition to the losses anticipated under our incremental stress factors.

Table 7

MassMutual Insurance Group/Capitalization Statistics

	—Year ended Dec. 31—				
(Mil. $)	**2008**	**2007**	**2006**	**2005**	**2004**
Total assets	125,110.6	131,557.0	122,179.6	113,586.4	108,886.2
General account assets	88,634.0	81,330.1	76,610.7	73,359.3	71,783.9
Total liabilities excluding separate accounts (excluding asset valuation reserve)	79,855.5	71,905.9	67,927.6	65,824.4	64,305.6
Total adjusted capital (including asset valuation reserve)	9,547.7	10,294.4	9,428.0	8,787.0	8,644.5
Unrealized capital gains	(26.6)	517.5	94.8	266.2	124.8
Capital adequacy ratio (%)	AAA	AAA	AAA	498.8	383.8
Company action level to NAIC risk-based capital ratio (%)*	443.5	447.1	458.4	459.4	472.1
High-risk assets to total adjusted capital ratio (%)	116.8	115.6	116.7	110.6	95.9
Net premiums to gross premiums (%)	94.6	94.8	95.1	95.4	96.0
Net reserves to gross reserves (%)¶	95.9	96.0	96.4	96.8	97.1

*Massachusetts Mutual Life Insurance Co. ¶Includes annuity and fund deposits.

Our capital adequacy analysis reflects our incremental stress factors added to criteria on Feb. 18, 2009. The currently stressed economic conditions, which are the most severe in recent decades, underscore our opinion that both the highest quality and quantity of capital are necessary to support higher ratings. For the current ratings, risk profile, and quality of capital, we expect MassMutual to maintain redundant capital at current levels.

However, the quality of capital is weakened by its dependence on the very material and concentrated portion of its capital base (approximately 30%) arising from the more volatile value of its asset management subsidiaries instead of more readily realizable and liquid financial assets that more easily absorb enterprise risks. Consequently, we view MassMutual's quality of capital as very strong but weaker than our quantitative model indicates, which measures a modest redundancy of capital at the extremely strong 'AAA' confidence level.

MassMutual is actively pursuing several actions to maintain capitalization, including repositioning selected higher-risk investments to reduce capital requirements, which could also erode investment income. The company also issued $750 million of surplus notes in June 2009 to bolster capitalization. The aggregate amount of surplus notes outstanding is now $1.35 billion. At this time, Standard & Poor's considers the entire amount as equity when evaluating the company's capital structure. The notes constitute more than 13% of the company's risk-adjusted capitalization. Standard & Poor's allows for surplus note amounts of up to 15% of risk-adjusted capital to be counted as hybrid equity.

Financial Flexibility: Very Strong But A Slight Weakness

MassMutual has very strong financial flexibility, though we consider it a slight weakness to the ratings. In June 2009, MassMutual consumed most of its financial leverage capacity for its capital and higher ratings with its surplus note issuance, which increased total financial leverage to approximately $1.6 billion, including outstanding commercial paper (CP). MassMutual's financial leverage ratio now slightly exceeds our 15% leverage tolerance for higher ratings, but it is well below our 25% leverage tolerance for the current ratings.

MassMutual's CP program is authorized for $1 billion, though management intends to keep only about $200 million-$300 million outstanding to maintain a presence in the financial markets and to provide a small spread opportunity with the proceeds. However, in periods of significant stress, it could become difficult to maintain CP issuance.

The company's remaining sources of financial flexibility are limited but include financing its XXX and AXXX redundant reserves and potentially selling certain affiliated operations. Many of these options have uncertain execution time frames, and it is more difficult to ensure execution and realize maximum value during an economic downturn and when capital markets are less liquid, which they currently are. Market conditions also have depressed the substantial unrealized appreciation of MassMutual's asset management subsidiaries, making it less likely that an attractive opportunity to monetize any portion of these assets would emerge prior to a substantial market recovery.

Ratings Detail (As Of 01-Oct-2009)*	
Operating Companies Covered By This Report	
Massachusetts Mutual Life Insurance Co.	
Financial Strength Rating	
Local Currency	AA+/Stable/—
Counterparty Credit Rating	
Local Currency	AA+/Stable/A-1+
Commercial Paper	
Local Currency	A-1+
Subordinated (4 Issues)	AA-
C.M. Life Insurance Co.	
Financial Strength Rating	
Local Currency	AA+/Stable/—
Issuer Credit Rating	
Local Currency	AA+/Stable/—
MML Bay State Life Insurance Co.	
Financial Strength Rating	
Local Currency	AA+/Stable/—
Issuer Credit Rating	
Local Currency	AA+/Stable/—
Domicile	Massachusetts

*Unless otherwise noted, all ratings in this report are global scale ratings. Standard & Poor's credit ratings on the global scale are comparable across countries. Standard & Poor's credit ratings on a national scale are relative to obligors or obligations within that specific country.