

UBS Investment Research

Q-Series®: Global Life Reinsurance

Is the Life Reinsurance Market as Attractive as Widely Thought?

■ **Is the life reinsurance pricing and growth outlook positive?**

Many investors and commentators appear bullish on the outlook for life reinsurance. We held extensive discussions with life reinsurance executives and actuaries and reviewed the latest actuarial studies to evaluate whether the optimism is warranted. Our conclusion: it is not in the U.S.

■ **Life reinsurance myths in need of debunking**

We look to debunk several U.S. myths: 1) mortality improvements will flow to the bottom line; 2) rapid growth will continue; 3) consolidation will strengthen pricing; and 4) hard pricing will boost near-term returns. But, we see top-line growth of 10-15% in Asia and 4-5% in Europe, both in line with their primary markets.

■ **Concerns: adverse selection, mis-pricing, reserve pressures**

We question whether U.S. pricing will prove adequate given increasing adverse selection, aggressive pricing for mortality improvements, table-shaving, and Regulation XXX reserve requirements.

■ **Most likely to be negatively affected—Scottish Re, Swiss Re**

Scottish Re's (Reduce 2) earnings stability and quality concern us, given several recent earnings misses and increasing operational strain. About half of Swiss Re's (Neutral 2) value is in life reinsurance, where it faces increasing competition for Admin Re deals and only modest profit growth, since its key markets are mature.

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www.ubs.com/investmentresearch**Andrew Kligerman**

andrew.kligerman@ubs.com

+1-212-713 2492

Ben Cohen

ben.cohen@ubs.com

+44 20 7568 8383

Heather Takahashi

heather.takahashi@ubs.com

+1-212-713 2452

Michael Klien

michael.klien@ubs.com

+41-1-239 1518

Gina Mok

gina.mok@ubs.com

+1-212-713 6109

Summary and Investment Case

Many investors and commentators appear bullish on the outlook for life reinsurance. We held extensive discussions with life reinsurance executives and actuaries and reviewed the latest actuarial studies to evaluate whether the optimism is warranted. Our conclusion: it is not in the U.S.

This subject is highly technical so throughout this note, we have defined key terms in footnotes. Also please see our soon to be published full Q-Series *report* on the global life reinsurance industry.

The U.S. Life Reinsurance Market—Issues Abound

We think the outlook for the U.S. life reinsurance industry is much less positive than generally thought and in Table 1 present a roster of myths that we look to debunk.

We think the outlook for the U.S. life reinsurance industry is much less positive than generally thought

In summary,

- **Already pricing for mortality improvements.** We think U.S. life reinsurers have already aggressively incorporated future mortality improvements into their pricing assumptions and, therefore, will not benefit from the trend towards improving mortality.
- **Mortality experience likely to erode.** Mortality experience is likely to erode in coming years given: 1) recent inter-company experience studies that have indicated the mortality slope¹ of the base pricing table used by most U.S. life insurers and reinsurers may be too flat; 2) the increased use of table-shaving² by primary insurers³; and 3) emerging factors likely to drive adverse selection.
- **Adverse selection coming to the fore.** Adverse selection on in-force business will likely begin coming to the fore, driven by: 1) the growing life settlements⁴ market; 2) the prevalence of preferred underwriting⁵ on new

¹ Mortality slope: The increase in death rates (number of deaths per 1,000 lives insured at the beginning of the period) in a block of insurance in each successive policy year or duration.

² Table shaving: The use of tables that lower the price of insurance, but may not technically fit the risk. For example, issuing a policy as a standard risk when the insured is, in fact, a non-standard risk, or issuing a policy as a preferred risk when the insured is, in fact, a standard risk. Insurers employ this practice to boost sales.

³ Primary insurer: An insurance company that insures individuals directly, as opposed to a reinsurer which insures other insurers. Also known as a direct insurer.

⁴ Life settlement: The sale of an in-force life insurance policy to a third party without an insurable interest in the insured's life. The buyer of the policy continues making premium payments and receives the death benefit when the insured dies.

⁵ Preferred underwriting: Extensive underwriting that allows insurers to offer discounted rates to insureds in particularly good health.

business in recent years; 3) increasing recaptures⁶ of coinsured⁷ business; and 4) expiry of the level-premium periods on level-premium term⁸ business first written in the 1990s.

- **Modest sustainable growth rate.** We think the sustainable growth of the U.S. life reinsurance industry is only in the single-digits and that the rapid growth of the late 1990s and early 2000s was driven largely by aggressive pricing.
- **Consolidation not likely a panacea...** The trend to industry consolidation is unlikely to benefit life reinsurers given the already concentrated nature of the market and the industry's low fixed-cost base. Life reinsurers are unlikely to consolidate their way to profitable growth.
- **...Nor are recent price increases.** Given the long-term nature of the life reinsurance product (current price increases take several years to impact the bottom line), we do not think the harder pricing environment of the past couple of years will necessarily remedy the sins of the past. It may only delay inevitable margin erosion.
- **Increasing Regulation XXX⁹ reserve strain.** We expect the demand for sources of financing for Regulation XXX reserves (statutory reserves for level-premium term) to become a significant source of financial strain in coming years. Actuarial consulting firm, Milliman USA, estimates that industry XXX reserves could increase to \$155 billion by 2015, a full 8.6 times their estimated level at year-end 2003. While the securitization market appears to be the most viable source of funding for this reserve strain, the market is largely untested with a limited number of multi-investor deals completed to date.

⁶ Recapture: The process by which a primary insurer takes back liabilities that it had previously ceded to a reinsurer.

⁷ Coinsurance: A form of reinsurance in which reserves and all risks (including investment, lapse, mortality, and expense risk) are transferred to the reinsurer. Premiums paid to the reinsurer are fixed for the duration of the business. Coinsurance contrasts with yearly renewable term (YRT) reinsurance where only mortality risk is transferred and the premiums paid to the reinsurer increase over time.

⁸ Level-premium term insurance: A form of individual life insurance in which premiums do not increase during the chosen level-premium period (normally, 5, 10, 15, 25, or 30 years). After the level-premium period, the premium increases every year even though the face amount remains fixed.

⁹ Regulation XXX: A U.S. statutory reserve requirement that applies to business written on or after January 1, 2000. Regulation XXX significantly increased the level of reserves that insurers are required to hold for level-premium term insurance.

Table 1: Debunking the Myths of the U.S. Life Reinsurance Industry

Myth	Debunking the Myth	So What?
<ul style="list-style-type: none"> ■ Mortality Improvement Will Be Reflected in Bottom Line. The benefits of improving mortality will be reflected in the form of higher earnings. 	<ul style="list-style-type: none"> ■ Most (if not all) life reinsurers have already aggressively priced for mortality improvement on North American lives. ■ North American primary companies normally earn the majority of their margins on mortality experience and a portion off of investment income, while losing money on expense experience (actual expenses are normally greater than expenses priced into the products). 	<ul style="list-style-type: none"> ■ Life reinsurer margins should gradually erode over time—and have already shown evidence they are beginning to erode—as actual mortality experience catches up with aggressive pricing assumptions.
<ul style="list-style-type: none"> ■ Industry Growth. The late 1990s growth in the U.S. life reinsurance industry was driven <i>primarily</i> by: <ul style="list-style-type: none"> — A desire by primary companies to get out of the mortality risk business and to focus on asset accumulation — The consolidation and demutualization wave 	<ul style="list-style-type: none"> ■ The late 1990s growth in the U.S. life reinsurance industry was driven <i>primarily</i> by: <ul style="list-style-type: none"> — Aggressive pricing by life reinsurers—demand for life reinsurance is highly price elastic, i.e., demand for life reinsurance increases when prices decrease — The advent of the level-premium term market (and Regulation XXX statutory reserving requirements for this product) and accompanying move to first-dollar quota share¹⁰ reinsurance 	<ul style="list-style-type: none"> ■ We estimate the real organic growth rate of the North American life reinsurance industry to be in the single digits, mirroring the growth of the primary market.
<ul style="list-style-type: none"> ■ Reinsurance Industry Consolidation To Strengthen Pricing. The on-going consolidation of the U.S. life reinsurance industry should enhance the growth prospects and pricing power of the remaining players. 	<ul style="list-style-type: none"> ■ If reinsurers try to increase prices, primaries are likely to cede less. Various primary companies are now indicating that they may raise their retention limits or move to excess-of-retention¹¹ terms from first-dollar quota-share. ■ There is a natural limit on the degree to which the market can consolidate, as primary companies do not want excessive concentrations of their ceded business with any one reinsurer. ■ Fixed costs ratios in the life reinsurance industry are already very low (for example, RGA's 2003 corporate expense ratio on operating revenues was only 3.8%, while Scottish Re's was 5.7%) meaning that life reinsurers have little to gain by spreading their fixed costs across a larger revenue base. Life reinsurance is <i>not</i> a scale-driven business. 	<ul style="list-style-type: none"> ■ Life reinsurers are unlikely to consolidate their way to profitable growth. ■ Consolidation from here on out may lead to <i>diseconomies</i> of scale.
<ul style="list-style-type: none"> ■ The Current Hard Pricing Will Boost Near-Term Returns. The current hardening of the pricing cycle should favorably impact life reinsurers' profitability. 	<ul style="list-style-type: none"> ■ The hardening of the pricing cycle may only slow the erosion of life reinsurers' profitability. ■ Any benefits from higher prices of the past couple of years will take years to impact life reinsurers' margins and even then, the impact might not be sufficient to offset years of aggressive pricing. 	<ul style="list-style-type: none"> ■ Hardening of the pricing cycle is not a panacea. It may only delay the inevitable margin erosion.

Source: UBS

¹⁰ First-dollar quota share: A form of reinsurance in which premiums and losses are shared proportionately by the primary insurer and reinsurer from the first dollar of each premium and claim.

¹¹ Excess of retention: A form of reinsurance in which the reinsurer agrees to pay the primary insurer for its losses in the event they exceed a pre-specified retention limit.

The Asian Life Reinsurance Market—A Growth Opportunity?

We regard the Asian life reinsurance market as a growth opportunity (driven by rapid primary market growth and the potential for increasing life reinsurance market penetration), while we expect life reinsurance growth in Europe to match primary market growth of 4-5%.

Scottish Re and Swiss Re—Under the Most Pressure, AEGON's Expansion a Concern

- **Scottish Re.** We have become increasingly concerned with Scottish Re's earnings stability and quality for several reasons. The company has missed consensus for four of the last five quarters and a positive non-recurring item drove the single quarter of outperformance. Scottish Re's risk profile appears to be increasing given its recent acquisitions of large blocks of seasoning¹², in-force business. We have additional concerns with the company's XXX reserve funding, tax status, and capital structure.
- **Swiss Re.** Swiss Re is the world's largest life reinsurer, with roughly 25% market share. We downgraded the stock to Neutral 2 from Buy 2 on valuation on January 11, 2005. While we forecast modest growth in the life reinsurance division, unattractive industry fundamentals lead us to conclude the division is unlikely to be a driver for a material re-rating. This division accounts for 50% of our sum-of-the-parts valuation. We have not moved our valuation on life reinsurance (1.1 times 2005E embedded value) because this multiple discounts our concerns regarding modest returns and acquisition-led growth. At our price target of CHF92, the company would be on 1.2 times 2005E adjusted net asset value for a 12% cross-cycle ROE. This compares to a European average of 1.3 times net asset value for a 15% ROE in 2005E. Our price target of CHF92 is based on our 2005E sum-of-the-parts analysis.
- **AEGON (Transamerica Reinsurance).** Contributing 17% of AEGON Americas' 2003 annual premium equivalents, we are cautious on the company's plans (set out in fourth-quarter 2004) to increase its U.S. life reinsurance market share by 50% from 10% currently.

¹² Seasoning: The process by which claims on life reinsurance business increase as the business ages. Claims normally increase more rapidly after the block of business has been in force for at least three years.

Global Market Snapshot

The global life reinsurance market represented total premiums of approximately \$29.5 billion in 2003, according to Swiss Re, and nine large players accounted for approximately 91% of the market (Table 2).

Table 2: Global Reinsurers in 2003 by Net Reinsurance Premiums Earned (\$ billions)

Company	Total	P&C (a)	L&H (b)	L&H % of Total	L&H Market Share
Swiss Re (c)	22,779	15,199	7,580	33%	26%
Munich Re (d)	25,499	18,337	7,162	28%	24%
GE Insurance Solutions	10,001	6,958	3,043	30%	10%
RGA	2,643	0	2,643	100%	9%
Hannover Re	9,181	7,001	2,180	24%	7%
General Re/Berkshire Hathaway	12,675	10,828	1,847	15%	6%
Scor (e)	4,162	2,638	1,524	37%	5%
Scottish Re Group	392	0	392	100%	1%
Converium	3,677	3,294	383	10%	1%
Total of Above	91,009	64,255	26,754	29%	91%
Estimated Total Market	175,540	146,040	29,500	17%	100%

Notes: (a) P&C: property and casualty; (b) L&H: life and health; (c) Swiss Re: P&C figures include P&C Business Group and premium business of Financial Services Business Group. (d) Munich Re: Premiums for reinsurance activities only, including intra-group transactions of US\$1.1 billion in P&C and US\$1.1 billion in L&H. (e) Scor: French GAAP.

Source: Swiss Re Economic Research & Consulting, company reports

Of these large global players, the majority are publicly traded and units of multi-line reinsurers (Table 2 and Table 3). However, there are two U.S.-listed stocks, Reinsurance Group of America (RGA) and Scottish Re Group, that are pure-play life reinsurers.

Table 3: Publicly-Traded Life Companies With Significant Life Reinsurance Operations

Company	Reuters Code	Bloomberg Code	Closing Price	Target Price	Rating	Market Cap (USM)	Price/Earnings			5-Yr. Est. Growth
			(1/19/05) (Local curr.)				2004E	2005E	2006E	
Aegon	AEGN.AS	AGN NA	€ 10.25	€ 11.30	Neutral 2	\$20,033	10.2 x	10.3 x	10.1 x	5%
Converium	CHRN.S	CHRN SW	CHF 11.00	CHF 7.40	Reduce 2	\$1,361	NM	14.5 x	11.8 x	(10)%
Hannover Re	HNRGn.DE	HNR1 GR	€ 28.82	€ 27.00	Neutral 2	\$4,520	11.3 x	8.0 x	8.5 x	4%
Munich Re	MUVGn.DE	MUV2 GR	€ 89.04	€ 96.00	Neutral 2	\$26,586	10.7 x	8.8 x	8.8 x	10%
RGA	RGA.N	RGA US	\$48.36	\$51.00	Neutral 1	\$3,006	13.4 x	12.0 x	10.9 x	10%
Scor	SCOR.PA	SCO FP	€ 1.48	€ 0.90	Reduce 2	\$1,577	13.0 x	7.1 x	6.8 x	5%
Scottish Re	SCT.N	SCT US	\$24.32	\$19.00	Reduce 2	\$873	11.4 x	8.6 x	8.8 x	18%
Swiss Re	RUKN.VX	RUKN VX	CHF 82.50	CHF 92.00	Neutral 2	\$21,592	11.0 x	10.6 x	11.2 x	8%

Company	Price/ BVPS (ex. AOCI) (a)	2004E ROE (a)	Dividend Yield (%)	2004E EMVPS (f)	Price/EV (g) 2004E	2003 Life Reinsurance	
						Prem. % of Total	US In Force (b) (US\$M)
Aegon	4.45x	5.1%	4.1%	€ 8.98	1.14x	87% (c)	\$120,900
Converium	0.80x	(35.5)%	0.0%	CHF 13.88	0.79x	10%	N/A
Hannover Re	1.43x	13.5%	3.5%	€ 23.09	1.25x	24%	38,900 (d)
Munich Re	1.26x	13.4%	1.7%	€ 78.08	1.14x	15%	\$515,625
RGA	1.60x	12.4%	0.8%	n/a	n/a	100%	\$895,574
Scor	0.89x	14.9%	0.0%	€ 1.77	0.84x	27%	\$71,429
Scottish Re	1.22x	11.9% (h)	0.8%	n/a	n/a	100%	439,172 (e)
Swiss Re	1.81x	19.0%	2.0%	CHF 69.03	1.20x	35%	\$1,572,663

Note: (a) For European companies, equity includes Accumulated Other Comprehensive Income (AOCI).

(b) Based on Munich American Life Reinsurance survey. (c) Life insurance premiums. (d) US Life reinsurance in force as of year-end 2002. (e) Includes ING Re life reinsurance in force as of year-end 2003. (f) EMVPS: Embedded value per share. (g) EV: Embedded value. (h) ROE excluding adjustments for Hybrid Capital Units.

Source: UBS

The global life reinsurance market is dominated by the U.S. market, which comprised approximately 65% of global life reinsurance premiums in 2003. The U.S. market has maintained a global market share in the 65-70% range since 2000—not coincidentally, the year that Regulation XXX was implemented (Table 4).

Table 4: Global Life Reinsurance Ceded Premiums (\$ billions)

	1990	1995	2000	2001	2002	2003
Life Reinsurance Premiums						
North America	4.31	6.00	13.47	15.40	17.82	19.57
Latin America	0.12	0.41	0.95	0.88	0.41	0.40
Western Europe	2.64	4.06	4.56	4.85	5.55	7.50
Asia	0.25	0.59	0.72	0.72	0.81	0.91
Rest of the World	0.48	0.60	0.72	0.75	0.81	1.11
World Total	7.79	11.66	20.42	22.60	25.40	29.50
Total P&C and Life Re. Premiums	69.06	104.86	117.94	133.25	153.84	175.54
Life as % of Total Reinsurance	11%	11%	17%	17%	17%	17%
% of Total						
North America	55%	51%	66%	68%	70%	66%
Latin America	2%	4%	5%	4%	2%	1%
Western Europe	34%	35%	22%	21%	22%	25%
Asia	3%	5%	4%	3%	3%	3%
Rest of the World	6%	5%	4%	3%	3%	4%
World Total	100%	100%	100%	100%	100%	100%
Estimated U.S. as % of World	n/a	51%	65%	67%	69%	65%
Year/Year Growth (in US\$)						
North America	n/a	7%	18%	14%	16%	10%
Latin America	n/a	28%	18%	-7%	-53%	-2%
Western Europe	n/a	9%	2%	6%	14%	35%
Asia	n/a	19%	4%	0%	13%	12%
Rest of the World	n/a	5%	4%	4%	8%	37%
World Total	n/a	8%	12%	11%	12%	16%
Western European Growth in EUR	n/a	n/a	n/a	10%	8%	13%

Notes: The figures only include cessions to non-affiliated companies. All figures shown are estimates as of October 2004. n/a: not available. Growth rates from 1990 to 1995 and 1995 to 2000 are CAGRs.

Source: Swiss Re Economic Research & Consulting

North America

Pricing for Mortality Improvements

We think a common misconception is that investing in life reinsurers is a way to invest in mortality improvement—an undeniable trend in the developed world. We think the logic is flawed because 1) reinsurance written on North American lives is usually already priced assuming aggressive mortality improvements; and 2) reinsurance written on lives in other parts of the world typically contains experience refund provisions (meaning that the reinsurer must share profits from mortality improvement with the primary company).¹³

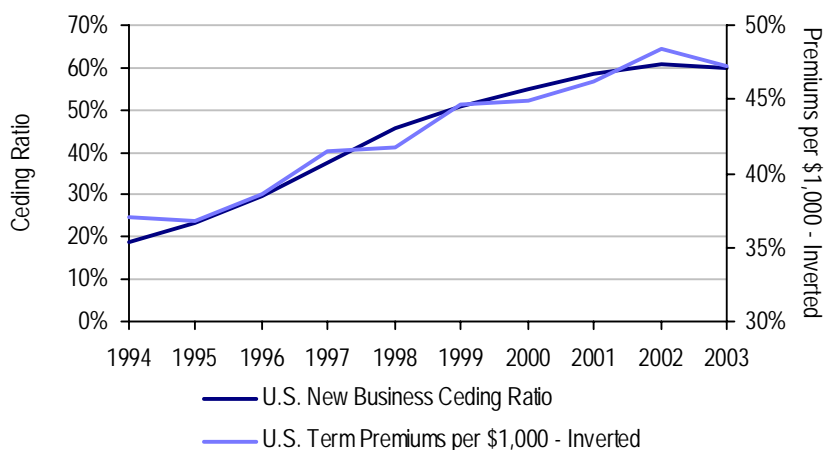
Investing in life reinsurers is *not* a play on mortality improvement

Historically, mortality improvement has been the chief source of profitability for primary life insurers in North America. Primary companies have normally lost money on operating expenses,¹⁴ but consistently earned generous margins on mortality. However, since at least the mid-1990s, life reinsurers have been pricing for aggressive mortality improvements and primary insurers—enticed by the attractive rates quoted by the reinsurers pricing for mortality improvements—have dramatically increased their use of reinsurance.¹⁵ As demonstrated in Chart 1, the percentage of business ceded by primary insurers increases as prices decrease.

¹³ Conference calls with 1) Dr. Wolf Becke, Executive Board member, Hannover Re, October 4, 2004; and 2) Romain Durand, chief executive officer and director and Florence Aurelly, chief financial officer of Scor Vie, October 7, 2004.

¹⁴ According to Swiss Re, by some accounts, insurers have been underpricing for expenses for decades. Swiss Re, "Preferred lives and mortality" (November 5, 2002)

¹⁵ While some primary insurers price for mortality improvement themselves, they more often rely on their reinsurers to do it for them. 55% of the 67 primary companies surveyed by the Society of Actuaries in 2003 indicated that they did not price for mortality improvements themselves. Companies that do price for mortality improvements most often do so only for term and fixed UL. (Society of Actuaries Survey, 2003)

Chart 1: U.S. New Business Ceding Ratio Versus Individual Term Life Pricing (Inverted)

Note: Individual term life new business pricing is used as a proxy for life reinsurance pricing as since the late 1990s, individual term life has been the primary product reinsured in the U.S. market.

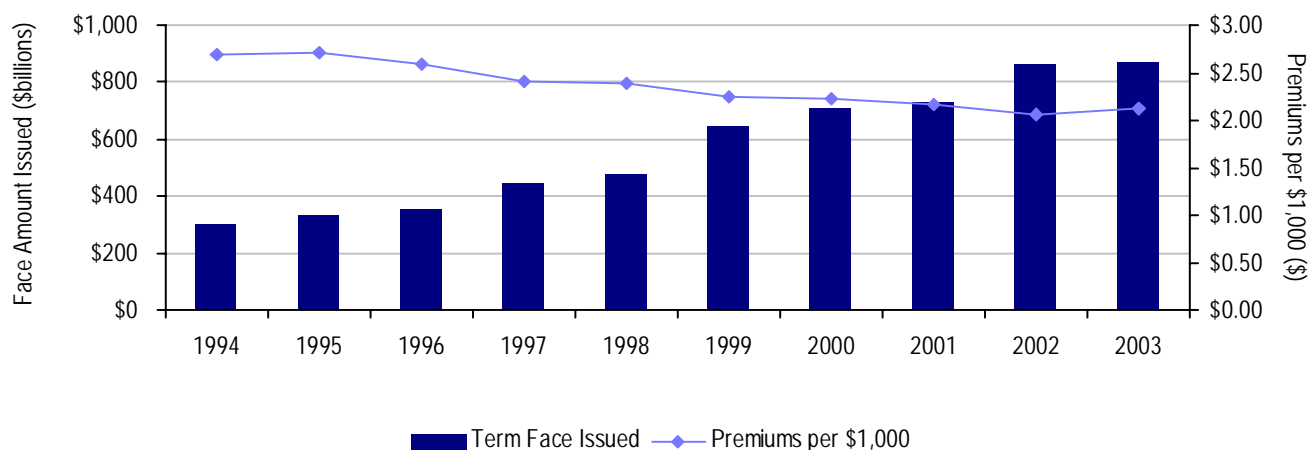
Source: LIMRA International, Best's Aggregates & Averages, Munich American Survey, UBS

The question then becomes: Are the life reinsurers relying too much on mortality improvements? For the following reasons, this appears to be the case:

- **Views from the experts.** According to John Tiller, Jr., former president and CEO of ERC Global Life & Health (General Electric's life reinsurance subsidiary), "I suspect that as an industry we're betting our future profits [on mortality improvement]. From what I've seen, if we don't get the mortality improvement, we'll probably get our money back, but it's going to be more like a bond rate rather than a risk rate."¹⁶ From our experience, Mr. Tiller's view echoes that of other industry executives who have, understandably, been less willing to speak on this topic on the public record.
- **Declining term life prices promote adverse selection.** Prices on individual term life (the product most often reinsured) have declined significantly over the past 10 years, likely as a consequence of preferred underwriting (which has become much more prevalent in recent years), as well as reinsurers' pricing for mortality improvements (Chart 2). Declining new business pricing increases lapses (as healthy policyholders lapse to take advantage of attractive new business pricing), which in turn creates adverse selection in the remaining in-force business (as less healthy policyholders cannot receive attractive terms if they are forced to again go through the underwriting process). We think this may result in deteriorating mortality experience on business written in the mid-1990s (or earlier) as aggressive pricing for mortality improvements emerged in the late 1990s.

¹⁶ From a Society of Actuaries forum, "The Future of Life Reinsurance" (October 2002).

Chart 2: U.S. Individual Term Life Sales - Face Amount Issued and Premiums per \$1,000

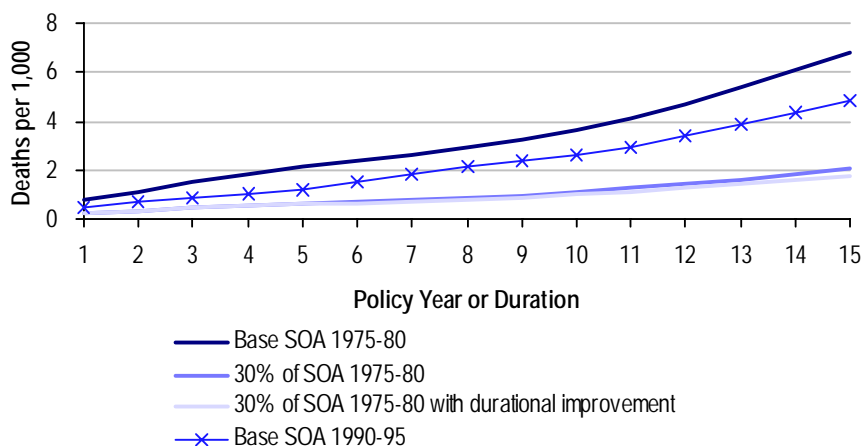


Source: LIMRA International, UBS

- **Additional adverse selection from level-premium term.** It was also in the mid-1990s that level-premium term sales began to take off. As the first significant amount of 10-year level term is just beginning to move into the non-guaranteed stage and high lapsation generating adverse selection normally occurs when the level-premium period ends, we may begin to see the impact of adverse selection in various reinsurers' mortality experience. As time passes, we expect to see greater mortality deterioration versus reinsurers' priced-for expectations.
- **Pricing off a mortality table that is too flat?** We think most U.S. life reinsurers have priced business written in the last several years assuming both mortality improvements from the Society of Actuaries Basic 1975-80 Select and Ultimate table (SOA 1975-80)—the base pricing table used by most primary life insurers and reinsurers of U.S. lives (Table 5). More recent inter-company mortality studies by the Society of Actuaries (such as the SOA 1990-95 study), however, have indicated that the mortality slope (i.e., the degree to which death rates increase in each successive duration of an in-force block of life insurance or reinsurance) is actually steeper than that reflected in the SOA 1975-80 table (Chart 3). If this is true, business priced assuming mortality slope improvements from this table may have been under-priced.¹⁷

¹⁷ Larry Warren, Chief Actuary of National Benefit Life (a Citigroup subsidiary), "The Relationship of Mortality Projections and the Underlying Mortality Tables Used" Reinsurance News, June 2002.

Chart 3: Mortality Table Slopes



Source: Society of Actuaries, UBS

Table 5: How Reinsurers Update Mortality Tables—Pricing for Mortality Improvements

There are two ways to update a mortality table:

- Assume a flat percentage (the lower the more aggressive) of the base table—normally the SOA 1975-80 table.
- Assume that mortality improves at each year the policy is in force. For example, if the reinsurer had assumed mortality improvement as a flat 30% of the SOA 1975-80 table, it could make the mortality improvement assumption even more aggressive by assuming, for example, in Year 1, 99% x 30%; in Year 2, 98% x 30%; in Year 3, 97% x 30%, and so on.

Both forms of mortality improvement assumptions make the table slope flatter than in the original table and combining the two makes the slope even flatter than the application of each type of mortality improvement by itself. Many life reinsurers use both forms mortality improvement assumptions and exacerbate this by using the very flat SOA 1975-80 or SOA 1980-85 tables as base tables.

Source: UBS

Various industry observers have rightly pointed out that mortality from the later durations of the 1990-1995 tables might overstate¹⁸ mortality as this business was written before the advent of preferred underwriting, blood testing, and, in some cases, before the advent of smoker/non-smoker underwriting distinctions. However, 1) preferred underwriting only became prevalent in the industry in the late 1990s; 2) most industry observers expect the impact of preferred underwriting to wear off¹⁹ as the business ages; and

¹⁸ In other words, mortality experience at high durations of the 1990-95 experience studies includes policies that were first issued before underwriting advancements such as preferred underwriting, blood testing, and smoker/non-smoker distinctions. Because of the less stringent underwriting when the policies were first written, one would expect the mortality to be higher than that of a policy first issued today.

¹⁹ Policies written with preferred underwriting can show mortality experience in the early years of very low percentages of the SOA 1975-80 table. However, as time passes from the original underwriting, the favorable characteristics that allowed the policyholder to qualify for preferred underwriting in the first place begin to dissipate. As a result, experience could develop to much higher percentages of the SOA 1975-80 table. For example, someone

3) given the newness of preferred underwriting, no one is yet sure how quickly it will wear off. Given these factors, we would expect the true slope of the mortality to still be steeper than that suggested by SOA 1975-80, even if it is not as steep as suggested by the SOA 1990-95 study.

- **Adverse mortality from table shaving?** Table shaving is the practice of issuing a policy as a standard risk when the customer is, in fact, a non-standard risk (or as a preferred risk when the customer is, in fact, a standard risk). According to our May 19, 2004, conference call with Tillinghast, table shaving is a common industry practice. However, the actuaries we interviewed believed that when table-shaved business is reinsured, the reinsurer is normally fully aware of the table-shaving program and prices for the business accordingly. The real issue becomes to what extent is the reinsurer completely aware of the underwriting practices of the ceding company? RGA, for example, estimates that about 5% of its total new business is table-shaved, but is confident that all of its clients inform it of their table-shaving programs. However, some ceding companies do not segregate business that has been subject to table-shaving from other standard business. Without more precise tracking of table-shaved business and robust underwriting audits of this business, table-shaving may eventually have a negative impact on life reinsurers' mortality experience.
- **Adverse selection from life settlements.** Life settlements (the sale by a policyholder of an in-force policy to a third party) have become increasingly popular in recent years. From life insurers and reinsurers perspective, however, they are highly problematic as they cause policies on impaired lives to remain in force when they would have otherwise lapsed thereby leading to post-issuance adverse selection.

Interest Rate Sensitivity of the Life Reinsurance Industry

Like most primary life insurers, life reinsurers also benefit from rising interest rates (and suffer from declining interest rates) as rising interest rates increase investment returns. However, life reinsurers may suffer even more from declining rates than primary companies given their unusually high weightings in long-term, fixed-premium, non-investment-oriented individual life products. This business is particularly sensitive to lower-than-anticipated investment yields on reinvested premiums.

According to Swiss Re, North America represented approximately 66% of global life reinsurance earned premiums in 2003. We estimate that of this 66%, the majority was reinsurance of either level-premium term or minimally-funded

who was lean at time zero could become obese in by year five. Someone who did not smoke at time zero could begin smoking. Someone who did not have cancer at time zero could develop cancer. And the list goes on.

universal life with secondary guarantees (ULSG) in the U.S. or these products' Canadian counterparts, term-to-100 and level-cost-of-insurance (LCOI) universal life. All of these products have the following features in common:

- Premiums are level for the term of the product although mortality costs escalate dramatically in later policy durations.
- The policy either does not have any investment component (level-premium term and term-to-100) or the investment component is insignificant in relation to the size of the stipulated death benefit (minimally-funded ULSG and LCOI universal life).

As a result of the above two factors, in addition to being lapse-supported (i.e., the product is more profitable to the insurer with higher lapses), these products are also unusually sensitive to declines in interest rates on an economic basis. This is because every percentage point decline in interest rates increases the present value of cash outflows from benefits more than it increases the present value of cash inflows from premiums.

However, under U.S. GAAP's Financial Accounting Standard No. 60 (FAS 60), insurers cannot change the interest rate assumptions used in calculating reserves unless estimated future premiums plus the existing reserve are inadequate to cover expected future claims plus the existing deferred acquisition cost balance. Therefore, despite the economic sensitivity of life reinsurance to low interest rates, we do not expect to see significant reserve or deferred acquisition cost charges in the companies' GAAP financials unless unusually low interest rates are sustained for many years.

Modest Returns on Equity

We have to exercise caution when a reinsurer claims to be pricing its business to a 15% ROE as not all pricing ROEs are created equal. One reinsurer's "15% pricing ROE" might be much lower than another's if the first reinsurer is assuming aggressive mortality improvements, unit-cost declines, or a low risk-based capital ratio in calculating the ROE. Scottish Re has said it has a 15% pricing ROE, while Reinsurance Group of America has a stated 13-15% pricing ROE. Several European companies have stated U.S. ROE targets of 10%-12%.

Likely few North American life reinsurers are earning double-digit returns on new business

Table 6: Life Reinsurance Segment Targets

	Return on Net Written Premiums	Return on Capital
Hannover Re	5%	■ Group target of 750 bps above risk free (i.e. a current return of approximately 10.5%)
Munich Re	n/a	■ More than 10% growth in embedded value operating earnings, more than 11% internal rate of return
Reinsurance Group of America	n/a	■ 13-14% GAAP return on equity ■ 13-15% pricing ROE
Scor	3%	■ Approximately 11% return on capital
Scottish Re Group	n/a	■ 15% GAAP return on equity
Swiss Re	n/a	■ Admin Re contracts priced for higher return than mortality business, we forecast 10% growth in embedded value. Key targets are a return on operating revenue of 9% and operating revenue growth of 7%. We think this translates into a 10-11% ROE.

n/a: not applicable: These companies do not have published targets for return on net written premiums.

Source: Companies, UBS

Constituents having access to detailed actuarial information (to which we are not privy) may have a less optimistic view of life reinsurers' returns. According to Manulife Re, the largest retrocessionaire of U.S. life reinsurers: "Many U.S. life reinsurers are struggling to meet their shareholder return requirements. On a U.S. GAAP basis, very few, if any, are making double-digit returns on their new business."²⁰ In November 2003, after deciding to discontinue writing new business in the U.S. life reinsurance market, GE Employers Reinsurance Corp. stated that the returns on U.S. mortality business were unacceptably low and that when the company tried to increase prices, ceding companies would not accept the revised terms.²¹ Hannover Re estimates that some of its competitors in the U.S. life reinsurance market were earning 4-5% returns on capital on new business in the late 1990s and now, may still be earning returns as low as 7-8% on new business.²²

Finally, we think the recent tribulations of two U.S. life reinsurers also highlight the difficulties of the U.S. life reinsurance market: 1) the recent sale of ING Re for a negative US\$560 million ceding commission (due largely to adverse mortality from under-priced business written in the mid-1990s); and 2) the dramatic market-value decline and ultimate delisting of Annuity and Life Re as a result of adverse mortality from under-priced business, losses on guaranteed minimum death benefits, and losses on convertible bond investments.

²⁰ Mike DeKoning, Manulife Re, "Capacity in the U.S. Life Insurance Market—A View from the Top of the Pyramid" (Reinsurance News, March 2004).

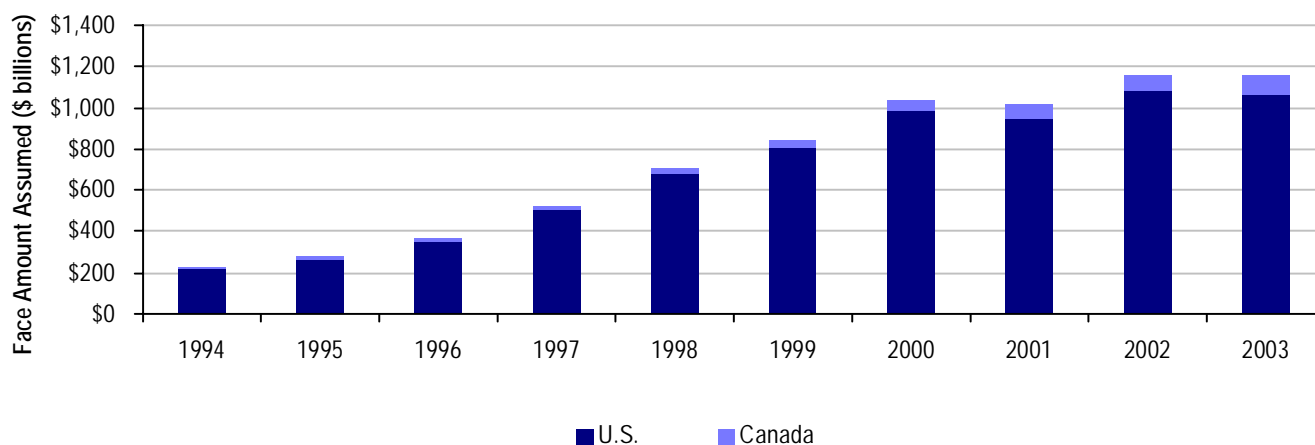
²¹ "GE ERC to Stop Writing New Life Reinsurance in the U.S." Best's Insurance News, November 6, 2003, citing John Novaria, a company spokesman.

²² Conference call with Dr. Wolf Becke, Executive Board member, Hannover Re, October 4, 2004

Modest Organic Growth Prospects

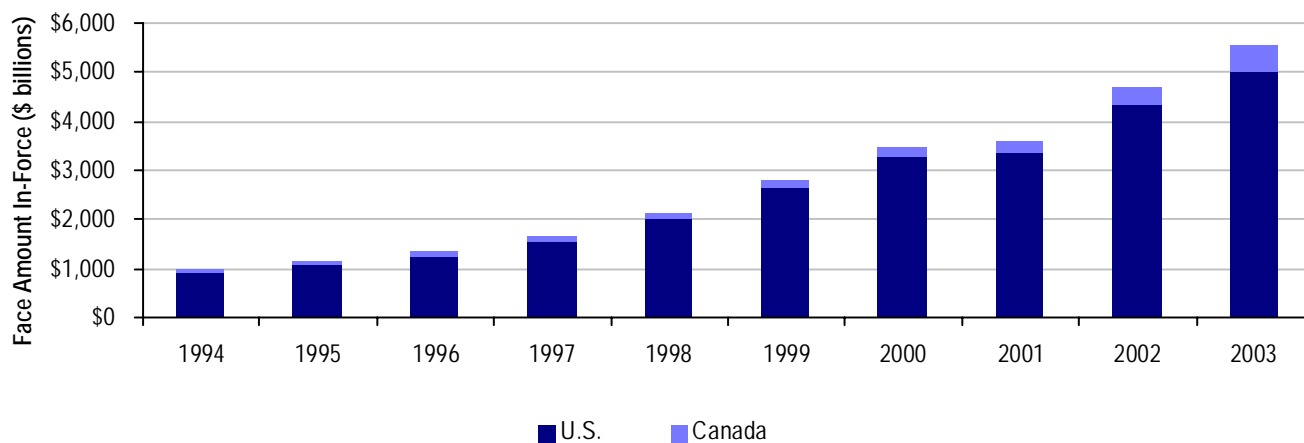
We think it is a common misconception that the North American life reinsurance industry has strong growth prospects. Between 1994 and 2003, North American life reinsurance assumed grew at a compound annual rate of 20% (see Chart 4) and life reinsurance in force grew at a compound annual rate of 21% (see Chart 5).

Chart 4: North American Ordinary Life Reinsurance Assumed (\$ billions)



Source: Munich American Survey

Chart 5: North American Ordinary Life Reinsurance In-Force (\$ billions)



Source: Munich American Survey

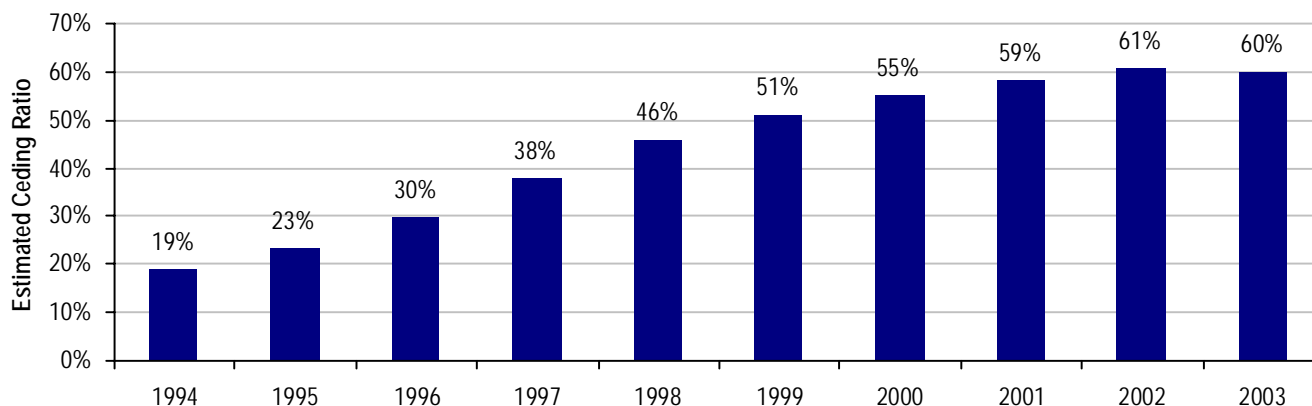
The reinsurance companies say that this growth was driven primarily by 1) a desire by primary companies to get out of the mortality risk business and focus on asset accumulation and 2) the consolidation and demutualization wave.

Much of the rapid growth of the late 1990s was likely driven by life reinsurers' aggressive pricing—of Triple X or level-premium term business in particular—and primary companies' desire to take advantage of that aggressive pricing, as demand for life reinsurance is highly price elastic. According to Chris Stroup, then CEO of Swiss Re Life & Health, "Why did the reinsurance market grow so quickly? The reinsurance marketplace was more aggressive at pricing mortality risk than the primary market was...."²³ When one strips away the artificial growth driven by aggressive pricing, we estimate that the true growth rate was dramatically lower.

We think that the sustainable growth rate of the North American life reinsurance industry is likely in the single-digits, reflecting our expectations for sustainable growth in the primary market. As the North American primary life insurance market is growing slowly (the long-term growth rate is likely in the single digits), an increase in the cession rate is the only growth driver for life reinsurance. The 2003 U.S. industry cession rate was approximately 60% and various industry players have estimated that the industry cession rate will ultimately top out between 60-70%. Scottish Re thinks the new business cession rate will increase to 70% over the next five years.²⁴ RGA's current estimate is that the industry cession rate will remain around 60%, as is Swiss Re's. Some of our industry contacts think that cession rates may actually decline below 60% in 2004.

We think that the sustainable growth rate of the North American life reinsurance industry is likely in the single-digits

Chart 6: Ceding Ratio - U.S. Individual Life New Business



Source: Best's Aggregates & Averages, Munich American Survey, UBS

From 2001 to 2003, the industry new business cession rate has remained relatively flat—hovering around 60%—and, in fact, declined to 60% in 2003 from 61% in 2002 (Chart 6). In our view, the maximum industry cession rate is

²³ "The Future of Life Reinsurance: Views from the Top" Record of the Society of Actuaries, Volume 28, No. 3, October 27-30, 2002.

²⁴ March 2004 Association of Insurance and Financial Analysts conference

more likely around the 2003 level of 60% implying that absent a growth in in-force transactions, the North American life reinsurance industry's growth should begin to reflect that of the primary industry. Between 1993 and 2003, the compound annual growth rate of U.S. individual life insurance sales was 1.5%.²⁵ LIMRA projects a 2-3% annual growth rate for industry sales over the next five years. In-force individual life has grown at a faster rate—an approximately 10% CAGR from 1994 to 2003.²⁶ Our own projection is that the long-term sustainable growth rate for North American individual life insurance in force—the product from which life reinsurers' derive the bulk of their profits and from which they are likely to continue to derive the bulk of their profits—is in the single digits, mirroring expected U.S. GDP growth.

Will Price Hardening Have a Meaningful Impact?

Based on comments by numerous industry players, North American life reinsurance pricing began increasing in 2002 and has continued to rise. However, for the following reasons, we do not expect this rate hardening will have a material positive impact on life reinsurers' earnings:

We do not think rate hardening will have a material positive impact on life reinsurers' earnings

- **Reinsurers are unable to change rates on in-force business, except with great difficulty.** Unlike in the property and casualty reinsurance industry, rate increases in the life reinsurance industry can take several years to impact earnings. This is because life reinsurers cannot change rates on in-force coinsurance business and can only change rates on in-force yearly or monthly renewable term (YRT, MRT) business with great difficulty. For example, Scottish Re has, to date, never raised rates on in-force YRT business. RGA has raised rates on in-force YRT only as part of a negotiated settlement resulting the ceding company's breach of the agreement and has never unilaterally raised rates in a YRT agreement. As reinsurers normally change rates only on new business and new business is generally a small percentage of a life reinsurer's annual premium flow (we estimate about 10%), higher premiums from re-priced business can take years to impact the bottom line.
- **In our view, recent rate increases may be inadequate after years of softening pricing.** There seems to be a general consensus among our industry sources that up until 2002, North American life reinsurance rates had been declining for several years, perhaps since at least the late 1980s.²⁷ Swiss Re commented in a meeting at the end of November that by the end of 2004, it would have raised prices by 8-10% in aggregate over the past two years. The company would not comment on how much prices had declined

²⁵ Source: LIMRA International, "U.S. Individual Life Insurance Sales Trends, 1975-2003" May 2004.

²⁶ Based on data from A.M. Best Aggregates and Averages, 2004.

²⁷ See the U.S. life insurance team's note of June 30, 2004, citing executive vice president and chief operating officer of RGA on this point.

since the peak of pricing, or when that peak had been reached. Five percentage points of Swiss Re's 8-10% price increase has been to make up margin lost to lower interest rates. The company commented that on some books, it had looked to raise prices by up to 15%, but that clients had generally refused, leading to a loss of business. After decades of soft pricing, we doubt that the rate hardening actions of the past couple of years will be sufficient to make a meaningful impact. In a recent presentation by Transamerica Reinsurance, the company stated "price increases reflect [the] underlying costs of doing business, not a move to profit from under-capacity."²⁸

Consolidation—Foe, Not Friend

The North American life reinsurance market has experienced rapid consolidation since the early 1990s. In 1995, 31 reinsurers reported to the Munich American/Society of Actuaries life reinsurance survey. By 2003, this number had fallen to 17. We summarize selected North American life reinsurance transactions completed over the last several years in Table 7. Following the completion of Scottish Re's acquisition of ING Re (on December 31, 2004), only 16 North American life reinsurers remain (and of these, four companies—Manulife, Sun Life, Guardian, and AXA—are retrocessionaires²⁹ writing no direct life reinsurance business).

Table 7: Selected Life Reinsurance Transactions with North American Targets

Announced	Completion /		Buyer	Target / Seller
	Announced	Termination		
10/19/2004	Pending	Scottish Re	U.S. life reinsurance business / ING Group	
10/24/2003	12/22/2003	Scottish Re	A portion of ERC's U.S. traditional life reinsurance business / General Electric	
9/22/2003	12/4/2003	RGA	U.S. Life reinsurance business/Allianz	
7/15/2002	7/15/2002	GE Global Insurance	AUL life reinsurance division / American United Life Insurance Co	
7/27/2001	12/7/2001	Swiss Reinsurance Company	Lincoln National Reassurance Company / Lincoln National Corporation	
10/10/2000	1/4/2001	Munich Re	Life reinsurance business / CNA	
1/19/2000	4/10/2000	Clarica Life Insurance Company	Sun Life of Canada Reinsurance Company (U.S.)/Sun Life Financial	
5/19/1999	8/1/1999	General Electric	Life and group reinsurance business/Phoenix Home Life Mutual Ins. Co.	
7/27/1998	12/1/1998	Swiss Reinsurance Company	Life Re Corporation	
6/19/1998	12/21/1998	Berkshire Hathaway	General Re (82% in P&C premiums / 18% in life/health premiums)	
8/28/1996	12/6/1996	Swiss Re	Mercantile & General/Prudential Plc	
8/1/1996	8/15/1997	Munich Re	American Re (primarily P&C with smaller life reinsurance operations)	

Source: UBS

²⁸ Presentation by Paul Rutledge, president of Transamerica Reinsurance, at the December 1-2, 2004, AEGON analyst and investor conference in New York City.

²⁹ Retrocessionaire: A reinsurer of reinsurers.

The remaining life reinsurers argue that consolidation should enhance their growth prospects and pricing power as it has removed both competitors and capacity from the market. We do not agree with this argument as:

- **Primary companies need diversification of reinsurers.** There is a natural limit on the degree to which the market can consolidate as primary companies need to manage their counterparty risks and do not want excessive concentrations of their ceded business with any one reinsurer. The U.S. market is already highly concentrated with the top five players accounting for over 80% of 2003 recurring³⁰ business in force and the top 10 accounting for virtually the entire market (Table 8). The Canadian market is even more concentrated with the top four reinsurers accounting for over 96% of 2003 recurring business in force (Table 9). One of the common remarks on the 2003 Flaspohler-Reyes Survey (a biannual market survey of North American life reinsurers) when primaries were asked what they wanted of their reinsurers was “no more acquisitions.”

Table 8: U.S. Ordinary Life Reinsurance In Force, Year-End 2003 (\$ millions)

2003 Rank	Company	Recurring	Portfolio	Retrocession	Total	Market Share -	Market Share -
						Recurring Only	Total
1	Swiss Re	1,450,229	122,434	0	1,572,663	29.0%	27.8%
2	RGA	791,188	104,386	0	895,574	15.8%	15.8%
3	Scottish Re/ING Re (pro forma)	792,663	40,125	924	833,712	15.8%	14.8%
4	Transamerica Re (AEGON)	525,986	0	0	525,986	10.5%	9.3%
5	Munich American Re	452,776	47,561	15,288	515,625	9.0%	9.1%
6	Employers/ERC (General Electric)	353,367	51,423	338	405,128	7.1%	7.2%
7	Generali USA Life Re	228,254	1,177	0	229,431	4.6%	4.1%
8	Revios Re (Gerling Global)	116,182	18,255	1,208	135,645	2.3%	2.4%
9	General Re Life (Berkshire Hathaway)	116,788	9,606	0	126,394	2.3%	2.2%
10	Canada Life (Great-West Lifeco)	98,234	4,002	0	102,236	2.0%	1.8%
Total of Top 10		4,925,667	398,969	17,758	5,342,394	98.3%	94.5%
Industry Total		5,008,710	405,950	236,845	5,651,505	100.0%	100.0%

Source: Munich American Survey, UBS

³⁰ Recurring business: In the life reinsurance context, this is business that the reinsurer assumes when the primary insurer first issues the policy. Recurring business is distinguished from portfolio or in-force business which is business that the primary company cedes to the reinsurer after the policies have already been in force for a period of time.

Table 9: Canadian Ordinary Life Reinsurance In Force, Year-End 2003 (US\$ millions)

2003 Rank	Company	Recurring	Portfolio	Retrocession	Total	Market Share -	Market Share -
						Recurring Only	Total
1	Munich Re (Canada)	211,844	0	6	211,850	38.9%	37.6%
2	Swiss Re	169,611	0	0	169,611	31.2%	30.1%
3	RGA Re (Canada)	76,166	0	2,429	78,595	14.0%	14.0%
4	ERC-Canada	65,634	0	0	65,634	12.1%	11.7%
5	Optimum Re (CAN)	11,940	433	0	12,373	2.2%	2.2%
6	Manufacturers Life	0	0	7,669	7,669	0.0%	1.4%
7	Revios Re (Gerling Global)	7,111	0	321	7,432	1.3%	1.3%
8	Sun Life (Clarica)	0	0	6,310	6,310	0.0%	1.1%
9	Canada Life (Great-West Lifeco)	1,917	0	0	1,917	0.4%	0.3%
10	Equitable (AXA)	0	0	1,174	1,174	0.0%	0.2%
11	General Re Life (Berkshire Hathaway)	265	0	0	265	0.0%	0.0%
12	Annuity and Life Re	0	0	80	80	0.0%	0.0%
	Industry Total	544,488	433	17,989	562,910	100.0%	100.0%

Source: Munich American Survey, UBS

- **Demand is price elastic.** As stated above, primary companies' demand for life reinsurance is highly price elastic. When life reinsurers try to increase prices, primary companies simply cede less. As an example of this, MetLife is currently undergoing a study of its outbound reinsurance practices given the recent market hardening and has indicated that the likely outcome of the study will be a decision to cede less. Both Lincoln National and Protective Life have also indicated that they may retain more business in the future given the hardening of reinsurance prices.
- **Expense ratios are already low, suggesting little room for cost savings.** General and administrative expenses as a percentage of revenue in the life reinsurance industry are already very low. Swiss Re is the biggest player by a margin, and has one of the highest expense ratios. This is in part due to the higher administration costs associated with the Admin Re business. Excluding Admin Re, Swiss Re disclosed a first-half 2004 expense ratio of 4%, in line with and no better than the peer average for 2004. Because of their very low fixed expense ratios, life reinsurers have little to gain by spreading their fixed costs across a larger revenue base. Life reinsurance is *not* a particularly scale-driven business.

Table 10: Corporate Expense Ratios (a)

	2001	2002	2003
Converium	2.3%	3.6%	3.3%
Hannover Re	1.9%	2.6%	2.3%
Munich Re	4.5%	4.3%	3.8%
RGA	5.5%	4.8%	4.5%
Scor	NA	NA	NA
Scottish Re (b)	13.4%	11.9%	8.0%
Swiss Re (c)	6.3%	6.6%	5.7%

Notes: (a) Ratios are calculated on total net premiums earned. (b) Scottish Re's expense ratio has historically been higher than the other companies' given its recent start-up nature, but we are modeling 5.8% for 2005E. (c) Includes Admin Re.

Source: Companies, UBS, on net premiums earned

Another important issue is the ultimate impact *past* life reinsurance acquisitions will have on the acquirers' profitability. In a 2002 industry journal, the chief operating officer of RGA stated the following:

“Acquisitions over the last six years have not been cheap—acquirers generally paid top dollar. Having some information about most of these acquisitions, I can tell you roughly what it took to have the winning bid:

- “A willingness to settle for a return on capital in the neighborhood of 9-10 percent;
- “An assumption that the great majority of expenses could be eliminated through consolidation; and
- “An assumption that the market share of the acquired company could be added to the market share of the acquiring company, even where that meant maintaining double shares of the new business of many ceding companies.

“In general, the acquirers have done a good job of eliminating expenses through consolidation of operations. They have also done a good job of holding onto, and in some cases adding to, market share—largely through an increase in pricing aggressiveness that went well beyond the minor improvement you'd expect from consolidation related economies of scale.”³¹

³¹ "Winners & Losers in a Converging Global Market" Reinsurance News, June 2002.

The Threat of XXX and AXXX

What Is Regulation XXX?

The Valuation of Life Insurance Policies Model Regulation—more commonly referred to as Regulation XXX—became effective for business written by most U.S. life insurers on or after January 1, 2000. Ostensibly, the purpose of the regulation was to require insurers to hold adequate reserves for level-premium term insurance business. Given the much higher reserve requirements under Regulation XXX compared with prior law, primary insurers were left with the choice of 1) increasing premium rates on level-premium term; 2) shortening the level premium periods offered consumers (10-20 year terms are most common); 3) ceasing to sell level-premium term; 4) accepting lower margins on level-premium term; or 5) ceding their level-premium business offshore to reinsurers not governed by Regulation XXX. To date, the overwhelming choice of most primary insurers has been option five—ceding their level-premium term business offshore to reinsurers not governed by Regulation XXX.

But for the primary company to secure reserve credit for the business ceded offshore, the reinsurer must either 1) obtain a letter of credit (LOC) for an amount equal to the ceded reserve; or 2) place assets into an onshore trust for an amount equal to the ceded reserve. The life reinsurer can, in turn, fund assets in trust through debt or equity issuance, or securitization.

Humpback Reserve Development and Letters of Credit Capacity

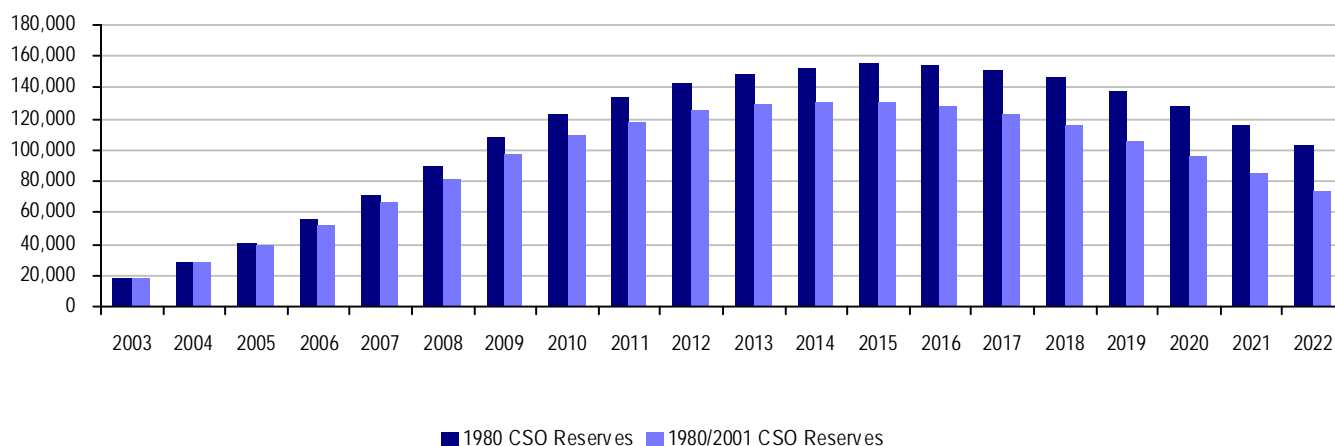
The threat now facing the reinsurance industry is the “humpbacked”³² development pattern of reserves under Regulation XXX. According to estimates by actuarial consulting firm, Milliman USA, total industry XXX reserves were about \$18 billion at year-end 2003. However, Milliman expects this amount to grow to about \$41 billion at year-end 2005 (2.3 times the 2003 level), \$90 billion by year-end 2008 (5.0 times the 2003 level), and then ultimately top out at about \$155 billion in 2015, a full 8.6 times the 2003 level (see Chart 7).³³

Milliman expects industry demand for LOCs to grow to about \$41 billion by year-end 2005, more than double the 2003 level

³² This industry terminology developed from the resemblance of a XXX reserve development chart to a humpbacked whale in profile.

³³ For details on Milliman's methodology in developing these estimates, see Juliette M. Burden, Gary R. Kelly, Bradley M. Smith, “XXX Implications” Reinsurance News, August 2004.

Chart 7: Estimated Industry XXX Reserve Development Pattern (\$ millions)

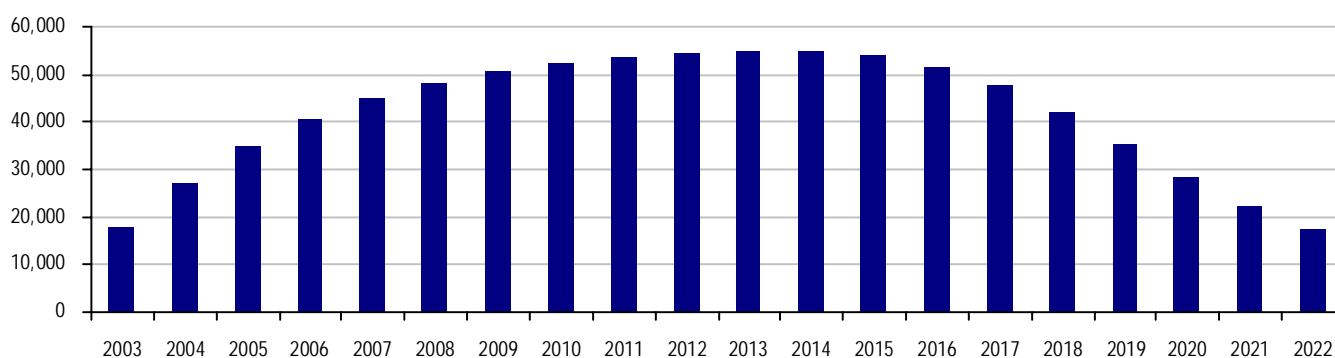


The 1980/2001 CSO reserves bars are calculated using the 1980 CSO mortality table for business written up to December 31, 2003, and the 2001 CSO table thereafter.

Source: Milliman USA

XXX reserves grow dramatically even on *in-force* business, i.e., the insurer does not have to write new business for its XXX reserves to continue increasing. This is because as the policyholders in the insured block age, mortality costs naturally increase, but given the level-premium nature of the product, premiums do not. Therefore, an insurer’s decision to cease writing new business will not obviate an XXX reserve strain problem. To put this in context, even if all insurers had stopped writing new XXX business in 2004, industry XXX reserves would have still increased to about \$35 billion at year-end 2005 (1.9 times the 2003 level), \$48 billion by year-end 2008 (2.7 times the 2003 level), and then ultimately topped out at about \$55 billion (3.1 times the 2003 level) in 2013, (see Chart 8).

Chart 8: Estimated Industry XXX Reserve Development—Business In Force at December 31, 2003 (\$ millions)



Source: Milliman USA

The issue for life reinsurers is that letters of credit are normally issued for maximum terms of one year, but capital strain from XXX reserves on both new

and existing business is expected to continue increasing for decades. While the cost of one-year letters of credit may be modest now, there is no guarantee that reinsurers will be able to secure on-going access to LOC capacity at these cost levels given the accelerating demand for XXX LOCs.

To address the LOC concern, reinsurers have taken two alternative courses of action, but we view each alternative as imperfect:

- **Asset trusts.** As mentioned above, an alternative to LOC use is for the reinsurer to put assets in trust to secure the ceding company's reserve credit. The issue with this alternative is that the reinsurer must still raise the capital to pay for the assets in the trust and the necessary collateral—and therefore capital requirement—will increase as XXX reserves increase.
- **Structured financing.** Within our coverage universe, both Scottish Re and Genworth have used structured financing to address the XXX issue, but again, we view this alternative as imperfect (as discussed in the following section).
 - *Scottish Re's five-year facility with HSBC.* Scottish Re has a \$200 million facility with HSBC with an initial term of five years (annually renewable thereafter) and is working on securing two more facilities. Although these longer-term facilities are preferable to the traditional one-year letters of credit, we think they are still an inadequate solution given that the primary term business to which they relate usually has 10-20 year level term periods.
 - *Genworth's First Colony/River Lake securitization.* Genworth securitized its First Colony subsidiary's XXX exposure by issuing \$600 million in 30-year floating rate notes in 2003 through a special purpose life insurer called River Lake Insurance. While the facility is long-term, it is still an imperfect solution as the rate it must pay investors is floating, not fixed.

Why Securitization Might Be A Solution to the XXX Problem

- In theory, unlike letters of credit, securitization vehicles can be a source of *long-term* funding for redundant XXX reserves and can be less expensive to the insurer than non-collateralized long-term debt or equity funding.
- In theory, a securitization vehicle could provide an insurer with fixed-cost means of laying off the significant risks (mortality, lapse, interest-rate, and expense) of long-term level-premium term or universal life with secondary guarantees.

However, while securitization might help life reinsurers to address their XXX issues, we do not expect it to be a complete solution to the problem for the following reasons.

Why Securitization Might *Not* Be A Solution to the XXX Problem

- The fixed costs (e.g., legal, accounting, actuarial) of securitization are high. Therefore, securitization is only viable for larger blocks of business.

- Will securities investors or bond insurers be willing to accept the risk of, in effect, coinsuring universal life with secondary guarantees (discussed in the next section) or long-term level-premium term insurance when professional life reinsurers with a sophisticated knowledge of these risks (e.g., RGA) are, themselves, uncomfortable with these risks? If they are willing to accept these risks, will they be willing to do so 1) at prices the insurers view as economic or 2) in transaction structures where the insurer retains no residual interest?

- As a corollary to the point above, the novelty and complexity of the securitized instrument (long-term level-premium term insurance) and its related risks present barriers to traditional fixed-income investors. The XXX securitizations to date have all been private placements and, according to Tillinghast, the investors in the transactions have been largely other life insurers. Once traditional investors do become familiar with product, the question then becomes whether the reinsurers' demand for XXX securitization capacity can be satisfied out of the amount the market is able to absorb.

- To date, we are unaware of any very long-term (i.e., greater than 20-year), fixed cost XXX securitization vehicle, even though Regulation XXX came into force on January 1, 2000. The vehicles we are aware of are either variable cost or medium-term. If securitization is truly a viable solution to the Regulation XXX issue, we think that it is odd that no transaction in the five years since Regulation XXX has been in force has provided a long-term, fixed-cost alternative.

- Both the First Colony and Scottish Re transactions involved vehicles that Genworth and Scottish Re, respectively, continued to consolidate under FASB Interpretation No. 46 (FIN 46: "Accounting for Variable Interest Entities"). Although neither Genworth nor Scottish Re have disclosed sufficient information for us to determine to what degree these transactions involved substantive risk transfer, the substantive risk transfer was likely limited given the continued consolidation under FIN 46.

Guaranteed No-Lapse Universal Life (Guideline AXXX)

Actuarial Guideline AXXX became effective for business written by most U.S. life insurers on or after January 1, 2003, and clarified the application of XXX principles to universal life (UL) with no-lapse guarantees, also referred to as UL with secondary guarantees or ULSG. A no-lapse guarantee provides that a UL policy will remain in force even if its account value falls to zero so long as the policyholder pays a specified minimum premium or keeps the value of a shadow

account positive. The product has been extremely popular with consumers over the past few years, garnering increasing sales.

Life reinsurers have generally been cautious in their approach to this product. RGA considers the product “flawed” and refuses to write it.³⁴ However, other reinsurers had agreed to accept this risk. According to an October 27, 2004, Society of Actuaries presentation, a number of reinsurers wrote the product up until two years ago, but since then, all reinsurers, but one, have left the market.

ULSG is risky because it is 1) lapse-supported (i.e., the product is more profitable with higher lapse rates, much like long-term care insurance) and 2) very sensitive to interest rates (the product is more profitable with higher interest rates, again much like long-term care insurance). The product is very similar to the term-to-100 and level-cost-of-insurance UL products that have been sold for many years in Canada and the Canadian experience has been that the ultimate lapse rates on these products are about 1.4% or lower.³⁵ However, our research on U.S. industry practices indicates that many U.S. life insurers have generally assumed ultimate lapse rates of 3% or higher on in-force ULSG business. We estimate that every one percentage-point error in the ultimate lapse rate assumption could result in a negative impact to the product’s internal rate of return of several hundred basis points.

So Now What?

We do not expect regulators to take action to alleviate the capital pressure of XXX and AXXX on insurers, since level-premium term is highly susceptible to lapse-driven adverse selection. We also think that in the current environment of politically ambitious state attorneys general and insurance commissioners, any political action that lightens the regulatory burden on insurance companies is unlikely to be forthcoming.

The rationale for Regulation XXX and Actuarial Guideline AXXX seems to vary depending on whom one talks to. Many stock companies view these regulations as an anti-competitive measure by mutual companies, while many mutual insurers view these regulations as a necessary response to loophole exploitation by stock companies. As outlined below, we find the mutuals’ argument somewhat more compelling:

- **The Evil Mutuals Theory.** In the early 1990s, primary stock companies began writing increasing amounts of level-premium term business. Level-premium term provides one of the key benefits of whole life—premiums guaranteed not to increase over a long period—but at a small fraction of the

³⁴ “Reinsurance Consolidation Impacts Direct Writers” Best’s Insurance News, October 15, 2003, citing Paul Schuster, an executive vice-president at RGA.

³⁵ Canadian Institute of Actuaries, “Lapse Experience Under Universal Life Level Cost of Insurance Policies” June 2003.

cost. Threatened by the potential for increased competition, the mutual life insurers lobbied for new regulation that would increase the required statutory reserves for level-premium term under the guise that the existing reserves were inadequate. Regulation XXX was the result. Under this theory, the reserves required by Regulation XXX are largely redundant (i.e., unnecessary) given mortality improvements and underwriting advances since the statutory valuation tables were developed and have no real purpose other than to thwart competition.

- **The Crafty Term (or UL) Writers Theory.** The NAIC adopted Regulation XXX to put an end to some term writers' practices of exploiting loopholes in the statutory valuation laws. Some companies were apparently using provisions in their products that allowed them to raise premiums in the event of a specified remote contingency as a justification for holding only one-year renewable term reserves on the products.

Similarly, the NAIC adopted Actuarial Guideline AXXX to put an end to some companies' practices of exploiting loopholes in Regulation XXX to hold lower statutory reserves for low-cash-value guaranteed no-lapse universal life even though the economic profile of the product is very similar to that of level-premium term.

We do not find the Evil Mutuals Theory particularly compelling and think that the second theory is closer to the truth. While most industry observers agree that XXX reserves are at least partially redundant, the extent to which they are redundant is controversial. Accordingly, for the following reasons, we do not think that investors should count on a regulatory solution to the XXX/AXXX crisis:

- **These regulations exist for a reason other than to thwart competition.** Level-premium term is highly susceptible to lapse-driven adverse selection as rates normally increase dramatically once the guaranteed rate period expires—this is a normal function of the insureds being 10 to 30 years older than when the policy was first issued. Policyholders who keep their policies in force after the guaranteed rate period expires normally do so because they are unable to find lower cost coverage elsewhere due to deteriorations in their health. The issue then becomes whether even the higher rates after the guarantee period are adequate to cover the insurers' increased mortality costs from adverse selection. However, as level-premium term did not become popular until the early to mid-1990s and the guarantees are normally at least 10-years long, primary insurers and reinsurers have limited experience with which to estimate the ultimate mortality experience of the product.
- **The current political environment is not conducive to a solution.** We think that in the current environment, any political action that lightens the regulatory burden on insurance companies is unlikely to be forthcoming.

Adverse Selection Through Recaptures

An emerging industry controversy is what the impact will be of recaptures on quota share business. Larry Warren, executive vice president and chief actuary of National Benefit Life (a unit of Citigroup), pointed out that 1) the primary company normally has the option to recapture at a treaty's 10-year mark; 2) given that first-dollar quota share business became widespread in the mid-1990s, we are just beginning to see recaptures of this business; 3) much more mortality risk is transferred under quota share terms than under excess terms (which prevailed up until about 1995); and 4) given that the primary has the *option* to recapture, we could see large-scale anti-selection against reinsurers beginning in 2005.³⁶

Primary companies are likely to recapture the quality business while leaving mis-priced business with the reinsurers (and, as discussed above, reinsurers are unable to increase prices on in-force coinsurance business and can only increase prices on yearly or monthly renewable term business with difficulty). If quota share reinsurance has been priced properly, a wave of recaptures should just be beginning and if a wave of recaptures does not materialize, it likely means the reinsurers mis-priced the business in the first place. Either way, the reinsurers lose. All treaties should have recapture provisions. The real issue is: how has the treaty's recapture provision been drafted? If a recapture at the 10-year mark is only allowed if the primary has increased its retention levels, then maybe the reinsurer is safe. Or maybe the reinsurer is still not safe because the primary could increase the retention just to allow it to use the recapture provision.

Life Settlements and Adverse Selection

Life settlements promote post-issuance adverse selection as 1) they allow policies on impaired lives to remain in-force when they would have otherwise lapsed and 2) they enhance the persistency of lapse-supported products. The practice has increased substantially in the last few years with the development of specialist life settlement companies and could have a substantial negative impact on the mortality experience of life reinsurers.

Life settlements promote post-issuance adverse selection

A life settlement is a policyholder's sale of his or her policy to a third party lacking an insurable interest in his or her life. The third party 1) generally pays the policyholder some amount greater than the policy's cash surrender value, (industry estimates are an average of 3.6 times higher)³⁷ but less than its face amount; and 2) continues paying the insurance company the premiums due until the policyholder's death. Life settlements are generally made on individual life insurance (of all types, including term) or in-the-money individual variable

³⁶ Larry Warren, "The Recapture Provision: Is it up to date?" Reinsurance News, March 2004.

³⁷ Life Asset Group, November 25, 2003; The Life Insurance Consumers Alliance estimates the average multiple is 5 times (April 16, 2003).

annuities with guaranteed minimum death benefits and dollar-for-dollar partial withdrawal features.

All policies subject to life settlements have been in force long enough to have reached the non-contestable period, i.e., the period (normally one or two years after the issue date) when the insurer can no longer refuse to pay benefits on the grounds of suicide or misrepresentation. As the non-contestable period is unique to policies written in the U.S. market, life settlement business is normally written on U.S. lives regardless of the domicile of the settlement company. There are life settlement companies with offshore domiciles and British, Asian, or Australian investors that acquire policies on elderly or terminally ill Americans.

We think that this issue represents yet another potential time bomb for the life reinsurance industry as the market for life settlements is potentially enormous and growing rapidly. Life settlement firms bought \$2 billion worth of face amount in 2002, 10 times the amount acquired in 1998. The industry's potential size is estimated to be the total in-force face amount of life insurance held by Americans aged over 65 or about \$500 billion.³⁸ The number of settlements appears to be increasing rapidly. Coventry First, a specialist life settlements company, stated in April 2003 that submissions to it had tripled over the past 12 months.

We think that this issue represents yet another potential time bomb for the life reinsurance industry as the market for life settlements is potentially enormous

Primary insurers and their reinsurers lose money from life settlements when the transferred policy 1) is lapse-supported as written (e.g., guaranteed no-lapse universal life) or 2) becomes lapse-supported through a deterioration in the insured's health not anticipated in underwriting (in the case of individual life) or adverse equity market movements (in the case of variable annuity guaranteed minimum death benefits with dollar-for-dollar partial withdrawals). While in theory the insurer does not lose money as long as the business is not lapse-supported or impaired, in practice it always is or the settlement company would not have acquired it—a classic example of adverse selection.

Paying for Administration Errors

Administration errors have become increasingly important source of negative earnings hits to North American life reinsurers. Three examples within our coverage universe are 1) the \$10.5 million charge taken by Scottish Re in third-quarter 2003 related to the mis-reporting of claims related to fixed annuity reinsurance treaties with Lincoln National; 2) the \$19.5 million positive impact to Protective Life's pre-tax earnings in 2002 and 2003 from its third-quarter 2002 discovery that it had overpaid about \$94.5 million in reinsurance premiums to various reinsurers beginning in 1991; and 3) Scottish Re's adverse claims

³⁸ The Economist, May 17, 2003.

experience of about \$2 million in second-quarter 2004 caused by a reporting backlog at ERC Life.

In our view, these events were not isolated incidents. We expect more material administration errors to be discovered in the future and as with the two examples above, we think that the errors are more likely to be resolved in favor of the ceding company and against the reinsurer.

The frequency of material administration errors arises from the trend, beginning in the 1980s, for primary companies to self-administer their reinsurance business. Self-administration is an arrangement whereby the ceding company administers the reinsured business, rather than the reinsurer, and provides the reinsurer with periodic reports of premiums, in-force, reserves, claims, and other data the reinsurer needs to compile its financial reports.

The difficulty with this system is that it relies on primary companies to keep records for business for which they are largely not at risk. According to Greig Woodring, president and CEO of Reinsurance Group of America, "I think most of us have known for a long time that data is an Achilles heel of the reinsurance industry. We depend on our clients to provide us the raw data that we use to make management decisions and business decisions. ... But, in fact, the data that we get from clients is more often suspect than we'd like to admit."³⁹

The difficulty with this system is that it relies on primary companies to keep records for business for which they are largely not at risk

While reinsurers are normally diligent about auditing treaties that are performing below expectations, they are generally less diligent about auditing treaties that appear to be performing well. For this reason, when material errors are discovered, as with the Scottish Re and Protective Life incidents, they are normally resolved in favor of the primary company and against the reinsurer or reinsurers.

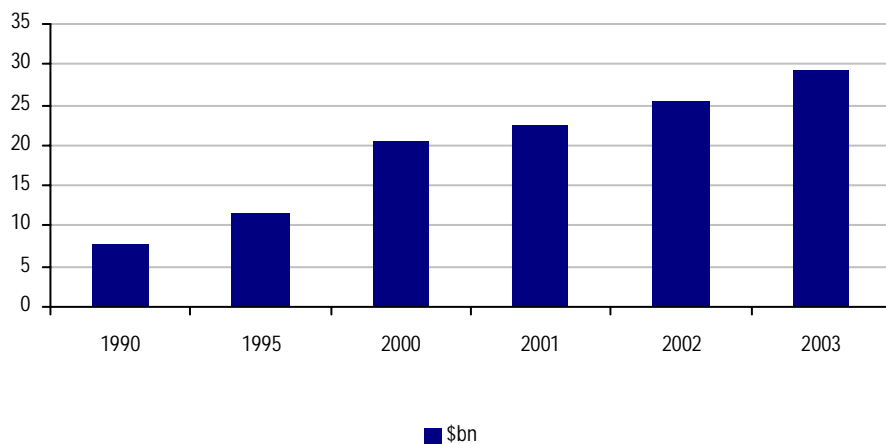
³⁹ From a Society of Actuaries forum, "The Future of Reinsurance" (October 2002).

Outside of North America

The Life Reinsurance Market Is Small

We believe that diversification efforts among P&C reinsurers to expand in life reinsurance have had a negative impact on pricing because the life reinsurance industry is only a fraction the size of the P&C reinsurance industry. We estimate that ROEs on the European business are currently in the 10-12% range.

Chart 9: Global Life Reinsurance, Total Net Written Premiums



Source: Swiss Re, October 2004

According to data from Swiss Re, the life reinsurance industry accounted for about 17% of global reinsurance premiums in 2003.

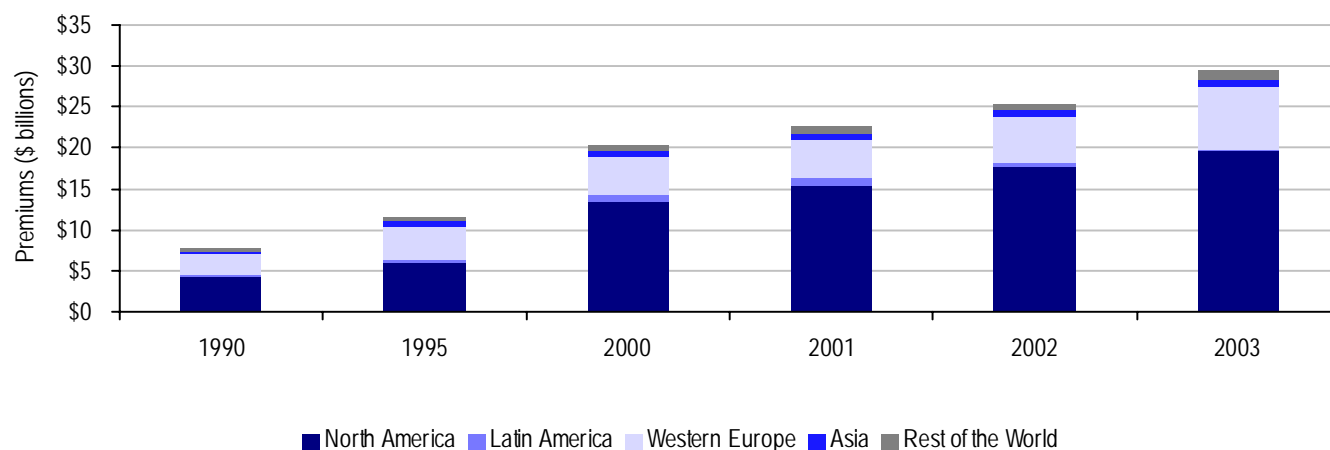
Life reinsurance market is less than a fifth the size of the P&C market

Europe

- Largest market is the United Kingdom, approximately 40% of total
- Cession rates well below U.S. levels (20-30% versus approximately 60% in the U.S.)
- Tougher solvency rules are a potential catalyst

How big is the market in Europe? Based on data from Swiss Re Economic Research & Consulting, the European life reinsurance market accounted for approximately US\$7.5 billion or 25% of global life reinsurance premiums ceded in 2003 (Chart 10). The relatively small size of the market helps to explain the lack of data surrounding it, in our view.

Chart 10: Global Life Reinsurance Premiums by Geography



Note: The figures only include cessions to non-affiliated companies. All figures shown are estimates as of October 2004.

Source: Swiss Re Economic Research & Consulting

We think the largest market in Europe by a margin is the United Kingdom, where primary companies reinsure new business strain on protection business. Reinsuring offshore reduces the capital strain, because reserving levels can be much lower. Protection products are more heavily reinsured because almost all the regulatory solvency relates to mortality risk, while other products have higher savings elements. After North America, the United Kingdom is the most developed market for life reinsurance, of major economies. Swiss Re is the largest underwriter in the United Kingdom. By market share data of the writers, the United Kingdom would appear to be about 48% of the European life reinsurance market.

UK is the largest market, and Swiss Re, the largest underwriter

Table 11: UK Life Reinsurance (Gross Written Premiums)

£ '000	2001	2002	2003
Swiss Re	614,287	642,693	638,494
Employers Re	329,582	315,912	540,195
Munich Re	180,499	284,474	511,224
XL Capital	34,733	544,878	295,442
Hannover Re	45,498	71,979	94,386
Scottish Re Group	5,337	5,267	63,518
Berkshire Hathaway	25,873	26,292	24,567
RGA U.K.	6,116	10,984	14,694
Total	1,241,925	1,902,479	2,182,520

Source: Synthesis

Market information by country is very limited outside the United Kingdom, but we think each market is highly concentrated, around two or three underwriters. We estimate that Germany is the largest life reinsurance market after the United Kingdom. We estimate Munich Re to be the largest life reinsurer in Germany, with an approximately 50% market share. In France, Scor claims to be number one, with 22% of the market. It is also a large player in Spain, where it is number two with a 15% share, and Italy, where it is number three with a 25% share.

Market in continental Europe highly consolidated

Scor identified a number of key differences between the U.S. and European reinsurance markets in a presentation in July 2004. To paraphrase Scor's description of the European market:

- Less competition in mortality but need to provide all lines of business
- Ability to provide services is key (e.g., administration, pricing)
- Capacity is more limited, particularly per event and catastrophe covers

We would add a more basic differential—namely, that the term insurance market in the United States is much bigger than in most European countries, even in relation to gross domestic product (GDP). This means that the size of the market for reinsurance must be much smaller in Europe. This gap is explained by much higher state social provision in continental Europe, while the strong growth in the United Kingdom and Australia is explained in part by mortgage growth, for which term cover is usually required.

The protection market is many times larger in the United States than in Europe

Table 12: Term Life Markets Compared (In-Force Premium, US\$billions)

	2002 Individual	1998-2002 CAGR	2002 Group	1998-2002 CAGR
United States	26.0	12%	27.0	1%
United Kingdom	4.0	19%	1.1	5%
Germany	2.0	8%	NA	
Italy	0.2	6%*	0.3	12%
Australia	1.0	9%	0.6	6%

Source: Sigma

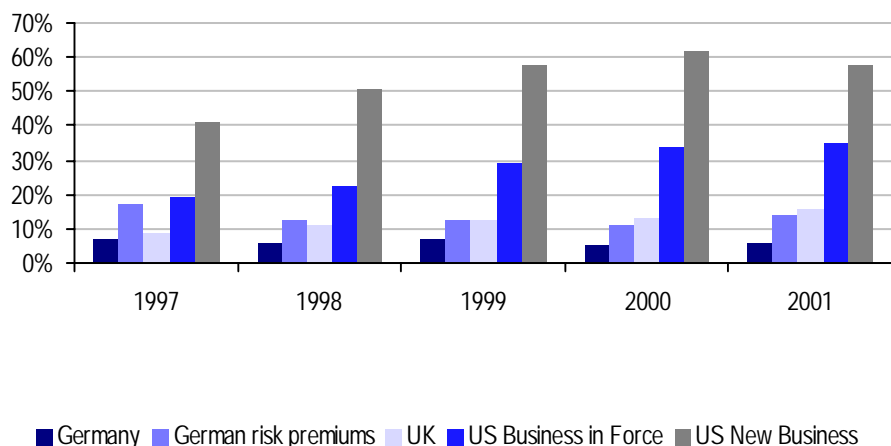
Growth in Europe

- Difficult to identify triggers for cession rates to rise
- Securitization is a threat to volume growth
- 4-5% long-term growth rate forecast, in-line with primary industry

The most obvious way for the market to grow would be for cession rates to increase. Scor has estimated informally that cession rates in Europe are 20-30%, compared to U.S. rates around 60%. While low interest rates and more onerous solvency requirements will likely encourage some increase in cession rates, it is hard to identify a strong driver. In markets with low investment return profitability, such as Germany and Switzerland, profits on mortality assumptions are one of the few ways in which primary insurers generate profits, along with expense savings. We see no reason why primary insurers should wish to give up these profits.

Not clear what would drive cession growth rates

Chart 11: German, U.K., and U.S. Cession Rates Compared



Source: Swiss Re (Ulrich Orbanz, University of Ulm)

Recent conversations with Swiss Re suggest they see material opportunity to increase volumes of surplus relief contracts for continental European insurers. Solvency requirements are likely to rise with the introduction of Solvency II. This will require companies to more accurately reflect the cost of embedded options when calculating their solvency position. This is expected to have a particularly significant impact in markets with high guarantees, and weakly capitalized mutual insurers that may struggle to access capital markets. We would thus expect the greatest opportunities in Germany. Munich Re, which heavily reinsurers its own primary businesses, Victoria and Hamburg-Mannheimer, as well as having a large share of Allianz Leben, could be a beneficiary here. The limited available data suggests that cession rates, above, are well below U.S. and U.K. levels, but this will not provide a spur by itself.

Impact of Solvency II

To the extent that primary private healthcare and long-term care markets are in their infancy in Europe, growth could come from these areas. Scor was the first reinsurer in France of the indemnity long-term care market. Swiss Re incurred large losses in the U.K. critical illness market, and withdrew in 2002, forcing a substantial restructuring of the entire market, such was its importance as a provider of reinsurance capacity. Swiss Re has since re-entered the market where cover can be repriced during the life of a contract. It has retained what it

Growth opportunities in healthcare and long-term care

describes as a profitable position in the Dutch market, which has a well-developed private healthcare market.

Hannover Re sees the greatest opportunity in cover for the 60-plus age group, as the European population ages. Product innovation could include adding living benefits to traditional life products. It sees the number one actuarial challenge in managing increasing amounts of longevity risk and associated risks like long-term care risk, and especially nursing care risk. It believes that there is still insufficient data to profitably write long-term care business. Scor has commented that it will only write long-term care products where the cover involves cash payment, rather than contracts where the entire cost of incapacity is covered.

In its New Markets division, Hannover Re has developed new products in areas including enhanced annuities⁴⁰ (where it launched the product in the United Kingdom), takafol bancassurance in Arabic markets (which is compatible with Shariah law), and Japanese Kyosei business. Volumes in 2004 have been impacted by the exit of Britannic from the enhanced annuity market in the United Kingdom, which Hannover Re had reinsured. The former management of Britannic Retirement Solutions launched a new business, Just Retirement, in September 2004, reinsured in part by Hannover Re.

Various niches globally for Hannover Re

Hannover Re also sees opportunities in bancassurance in European and Asian markets, and has contracts with Citibank and Postbank in Germany. In its financing ('stochastic banking') division it has built a position as leader in financing new business strain for unit-linked contracts in Germany. Disclosure on other participants in this market is limited.

In the medium term, the growth rate in life reinsurance is likely to match growth in primary insurance. Sigma's report on term assurance suggests that there is a large protection gap in most major economies. We are skeptical as to how quickly this gap closes—like a lot of analysis of saving and life trends, it comes down to saying that poor people are unable to, or do not, save enough. We would estimate growth in the 4-5% range in Europe in the long-term, a small premium to GDP growth.

Reinsurance growth rates linked to primary growth

Longevity Risk

- Demand for annuities is being stimulated by government reform
- Should increase demand for reinsurance
- Interest from reinsurers is low

⁴⁰ An enhanced annuity is a payout annuity where the annuitant is more likely to die than the average person, normally due to an illness or condition, and so the terms of the annuity are more attractive than normal for the customer.

A recently published report by the Staple Inn Actuarial Society in the United Kingdom (“Financial aspects of regulatory risk”) comments on the increase in the size of the enhanced and impaired life annuity market, which it believes represents 10% of the individual annuity market and 21% of open market annuities (such as compulsory purchase annuities). It quotes research suggesting that offering more than 10% of the market enhanced terms was likely to cause adverse selection among the remaining 90%.

Growth in enhanced and impaired annuity markets

Regulatory change in continental Europe should increase the demand for annuities, as governments facing long-term population decline move to ensure that more long-term saving is used to provide income over the course of retirement, rather than being available in a lump sum. Germany has reformed the tax treatment of certain savings products, starting in 2005, so that a proportion of payouts must be taken as an annuity, replacing a popular endowment policy that pays out in a lump sum.

Growth in continental European annuity markets could drive reinsurance growth

Similar reform is happening in France. The new PERP (“le Plan Agipi Innovant pour la Retraite”) pension product, launched in April 2004, must be held until retirement and pays out in an annuity. This product augments traditional life insurance, which has been sold to an older market than the target for PERPs, and so the overall savings market is expected to grow on the back of this. Planned reform of the pension system in Italy, to move more of the savings system into the private sector, should also increase the size of the annuity market in time.

Governments encouraging annuity markets to ensure savings are spent on retirement

These changes are likely to grow the European annuity market in time (although this is more on a 20-year view). Reinsurers have historically been reluctant to underwrite longevity risk, but strong growth in the primary market could encourage the development of this market.

Impact of Standardized Reserving Levels In Europe

- First EU proposals suggested manifold increases in reserves
- Compromise with industry unlikely to lead to major changes in reserving requirements

The European Commission’s proposal (of April 12, 2004) to standardize solvency requirements for life reinsurance in Europe has elicited strong reaction from the insurance industry. The Comité Européen des Assurances (CEA) wrote in a June 2004 policy statement that it strongly opposed the proposed 3 per mille (0.3%) of the sum at risk approach for the calculation of the required minimum solvency margin. It also objected to the extension of the life solvency formula (4% of mathematical reserves) to reinsurance business, where the investment risk remains with the direct insurer.

Most life reinsurers, when reinsuring mortality risk, will typically hold between 0.5%-1% of reserves as shareholders’ capital. We expect a compromise to be

reached which will raise current reserving levels, but not to the levels suggested by the European Commission, given the impact to life reinsurers' return on capital that this would cause.

The Rest of the World

- Australia and South Africa only sizeable markets outside North America and Europe
- Opportunities in Japan through increase in cession rates
- Expect 10-15% growth in primary life premiums in emerging Asia, versus 5% in North America and Europe

Major life reinsurance markets outside Europe and North America include South Africa and Australia. South Africa has one of the highest rates of primary life insurance penetration, life premiums totaling 13% of GDP in 2003, according to Sigma. Its market has also developed along similar lines to the U.K. and U.S. markets, with a highly competitive market where Swiss Re and RGA are the largest players. Australia may be a slightly larger market than South Africa, but both are small relative to the U.S.

South Africa and Australian markets are well developed

Table 13: Australian Life Reinsurance by Gross Written Premiums, 2001 (A\$millions)

	Gross Written Premiums
Hannover Re	261
Swiss Re	223
General Re	113
Gerling	100
RGA	97
Munich Re	94

Source: KPMG

The quantity of data outside of South Africa and Australia is extremely low. Swiss Re and Munich Re both see considerable long-term opportunity in the Chinese and Indian markets. We understand that there are greater short-term opportunities in the non-life than life reinsurance market, with development of this market being more a function of a maturing, rather than a rapidly growing, life market. Cession rates in Japan are around 5%, according to Scor, and might rise in time towards European (20-30%) and eventually U.S. levels (60%), presumably because of improving capital management.

Emerging market opportunities in India, China and Japan

In terms of the growth potential, absent more data, we would expect growth rates in reinsurance to match primary market growth. Our colleagues in Asia forecast life premium growth in the 10-15% range, consistent with the last five years.

Table 14: Larger Emerging Markets Growth Rates (\$ millions)

	Gross Written Premiums	Annual Change	
	2003	1998-2003, inflation-adjusted	Forecast growth, 2005
Asia			
South Korea	41,998	-1.2%	
China	32,442	31.6%	12%
Taiwan	23,739	15.2%	
India	13,590	17.5%	
Hong Kong	10,117	20.0%	20%
Singapore	5,561	14.1%	10%
Malaysia	3,455	12.9%	
Thailand	3,222	17.5%	
Latin America			
Brazil	6,306	16.6%	
Mexico	4,230	3.2%	
Chile	2,171	8.3%	
Eastern Europe			
Russia	4,887	27.3%	
Poland	2,312	9.3%	
Czech Republic	1,424	18.9%	
Sub-total	155,454		

Source: Sigma, UBS estimates

If information on growth in emerging markets is limited, information on profitability is almost non-existent. We would put forward that upfront investments being made in China, India and Japan by the larger life reinsurance groups means that these operations are currently loss-making.

Administrative Reinsurance (Admin Re)

After mortality reinsurance, the biggest life market for Swiss Re is the run-off of closed books of business, which Swiss Re labels “Administrative Reinsurance” or “Admin Re.” These contracts are structured either as the acquisition of a company, including staff and processing systems, or the reinsurance of that business. Admin Re must price many factors in buying or reinsuring closed books from companies looking to exit a class or, more frequently, a territory. These contracts are extremely complex and involve substantial due diligence and price negotiation. In some ways, the business is closer to life M&A than conventional underwriting, with Admin Re having to evaluate product mix, investment assumptions, persistency, infrastructure costs, location and other factors.

Closer to M&A than traditional reinsurance

Most of these deals are not reinsurance at all, in that they are the management of closed books of primary business.

Typically, these books are acquired at discounts to embedded value. Swiss Re leverages the return as the policies run-off by reducing expenses, potentially allowing for tighter controls on claims, and, above all, by leveraging the balance sheet. Swiss Re's size and capital strength means that it can borrow at terms far more beneficial than the majority of companies from which it acquires books.

We understand from Swiss Re that Admin Re earns a return on capital of 10-11%, but the company has never given satisfactory disclosure on how this return is generated. We analyze the main levers of return below:

- **Expense reduction.** Swiss Re produces almost no details on the impact of expense savings in achieving target returns on its closed life contracts. The majority of the administration of contracts is outsourced to CSC, a global IT outsourcing and systems provider. Swiss Re signed a 10-year, \$700 million business processing outsourcing agreement with CSC in January 2004, extending the relationship entered into in 1995. Swiss Re involves CSC in pricing larger acquisitions, because the cost of system conversion can have a material impact on an appropriate purchase price. While neither party have disclosed details of the contract, Swiss Re has said that it negotiated tighter service standards for the 10-year deal, and that it has set up a dedicated middle office to monitor the quality of service that its third party administrators are providing.
- **Investment returns.** Swiss Re has not disclosed how it has restructured the investments of any of the portfolios that it has acquired.
- **Using debt to leverage returns.** Swiss Re provides no breakdown of capital and debt allocation within the company, or within Admin Re.

How does the company measure the profitability of this business? Externally, the company gives targets only for a return on operating revenues for the life and health reinsurance division, including Admin Re, as well as growth in operating revenues on the same basis. Unfortunately, this does not reconcile with any industry standard measure of profitability.

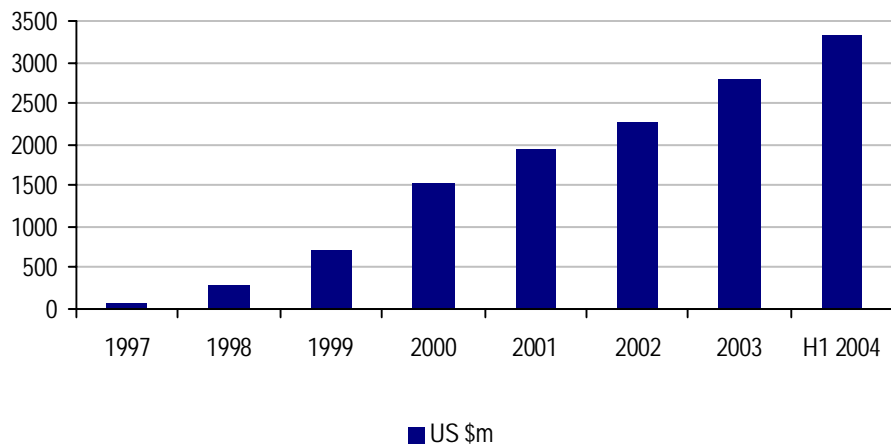
Admin Re Growth Potential

Admin Re is the largest manager of closed books globally, having completed 38 deals since 1995. While this market is well developed in the United States, few contracts have been written outside North America. Swiss Re signed in August 2003 its first Admin Re contract outside North America, a US\$240 million acquisition from Zurich Financial Services in the United Kingdom. It followed this with the acquisition of LAHC in the United Kingdom for £333 million in August 2004. Admin Re reduced capital invested in 2002 and first half 2003, as the corporate centre raised group hurdle rates to reflect the rapidly rising return opportunities in property and casualty reinsurance. The group has increased capital allocated for new contracts in 2004 as P&C opportunities have declined.

Nascent market outside US

It signed its largest ever deal to acquire CNA Life in first-half 2004. Total value added by new business in first-half 2004, according to the company, almost equaled the total for 2003 (CHF 314 million versus CHF 303 million).

Chart 12: Capital Invested in Admin Re



Source: Swiss Re

We believe growth in Admin Re will be driven by a number of factors:

- **Available capital to be committed.** Over the next two years, we think the alternative to acquisition of closed life books for Swiss Re will be capital return to shareholders.
- **Internal and external resources.** Admin Re has a team of 100-plus staff working on potential deals. The ability to enter new contracts depends in part on its own resources (the LAHC deal might add capabilities here, as they had their own vulture fund) and on those of outsourcing partners. Swiss Re has commented that the lack of outsourcing infrastructure limits the attractiveness of doing deals in continental Europe.
- **Suitable acquisition targets.** Swiss Re's view is that the bulk of the small deals have been done (in the United States at least) and that to drive material growth, it must look to larger deals.

Increasing capital and regulatory requirements, consolidation should all increase pressure on marginal players to exit all or parts of various markets. In the medium-term, the greatest opportunities may exist in the United Kingdom, where there are many closed life funds, but also where the regulatory and employment environment allows for fund mergers. The flurry of deals at the end of 2004 suggests, however, that competition has increased, as has the market's risk appetite for elements including with-profits funds.

Opportunities in the UK

Swiss Re commented in 2004 that it is not interested in acquiring with-profits funds in the United Kingdom. The acquisition of LAHC included a sizeable amount of goodwill, paid to reflect the value of new business from Department of Work and Pension rebates. These are a rebate of part of National Insurance contributions for those who have opted out of the earnings related portion of the state pension scheme. Others in the U.K. market are encouraging many policyholders who opted out of the state system to opt back in. Were LAHC to do this, this could reduce the goodwill in the business.

As well as buying closed life funds, there is also the opportunity to buy sub-funds of larger businesses. The list below is sourced from Britannic, in the context of the opportunities they saw for acquiring life companies in the UK, and includes companies that are open to new business.

Table 15: Major UK Closed Life Funds (£ billions)

Parent Company	Assets
<i>HHG*</i>	30.2
Equitable Life	19
Lloyds TSB	17
Zurich	11.9
Britannic	11
AEGON	8.2
Sun Life of Canada	7.5
Barclays	5.5
Lincoln National	4
Century Group	1.6
<i>Swiss Life**</i>	1.3
RBS	0.7
Chesnara	0.7
ILP	0.5
Reliance Mutual	0.5
Total	119.6

Source: Britannic, UBS, *sale to Sun Capital, announced December 2004; **sold to Resolution Life, announced December 2004

Swiss Re has indicated that continental European labor laws diminish substantially the attractiveness of rolling up life funds. Lack of outsourcing infrastructure also acts as a barrier to entry. We note that no deals have been done outside of the United Kingdom and the United States to date.

Competition Is Increasing

Swiss Re has few competitors in this market. There has generally been a scarcity of Admin Re-type transactions in the United States. Life Re, which was acquired by Swiss Re in 1997, had been focused on Admin Re, and Swiss Re has maintained this platform. Protective Life has been focused in this area for at

Few similar deals in the US

least 15 years, but has not completed any deals in the past two years. Numerous companies have done one-off Admin Re-like deals over the years, but none recently.

LAHC, which Swiss Re has acquired, was formed in 1994 to acquire closed life books in the United Kingdom—its largest assets were Windsor Life and GAN Life. Resolution Life in the United Kingdom was set up in 2003 to acquire closed life books. A private company, it acquired RSA's U.K. life operations in September 2004 at 64% of embedded value for £850 million. It followed this deal with the acquisition of Swiss Life's U.K. fund in December 2004 for £205 million, 76% of year-end 2004 embedded value. Resolution Life stated that it had a further £950 million to spend, to take its total investment to £2 billion. Although a smaller competitor, Resolution has put more capital to work more quickly than Swiss Re since its launch. While it has no plans to expand into the United States, it is reasonable to expect others could copy the model in the United States.

A more active market in the UK

Table 16: UK Closed Life Deals

Acquirer	Acquiree	Date	Size (£m)	Price to EV	Comment
Swiss Re	Zurich Life (UK)	Aug-03	USD460m	c. 70%	■ UBS estimate.
Swiss Re	LAHC	Jul-04	333	100%	■ UBS estimate.
Resolution Life	Royal SunAlliance UK Life	Sep-04	850	64%	■ Year-end embedded value.
Resolution Life	Swiss Life UK	Dec-04	205	76%	■ Year-end embedded value.
Sun Capital	HHG's life operations	Dec-04	1,025	74%	■ Year-end embedded value.
Britannic	Allianz UK life	Dec-04	152	76%	■ Price paid includes capital injected post-sale.

Source: Companies, UBS estimates

Another competitor emerged at the beginning of December 2004, with the £1 billion purchase of HHG's life funds by Sun Capital, led by entrepreneur Hugh Osmond, the day after the Swiss Life sale was announced. While the bid vehicle appeared to have a high level of gearing or leverage, the acquirer commented that it was looking to make further acquisitions in the sector.

Britannic, which had been indicating an interest in the market for some time, closed its own deal with the purchase of Allianz's U.K. life business in December. Britannic paid 76% of estimated year-end embedded value for the £152 million book. Britannic has indicated it is interested in entering the market, as its life fund is largely closed to new business. Old Mutual has been looking for a closed life fund to acquire for the past two years, with a view to moving policy administration to a lower cost environment in South Africa. The company indicated in October that it was still 12-18 months away from having the systems in place to convert third party systems onto its own platform.

Swiss Re commented at the end of November that it did not see new entrants having a material impact on its ability to find new business. It also sees a strong

pipeline of new business into 2005, which we presume to be the United States, given the increased competition in the United Kingdom.

■ Statement of Risk

Investment risks for life reinsurers include adverse mortality, adverse selection, rapid interest rate changes, weak credit and economic conditions, earnings dilution, and ratings downgrades.

Investors in Swiss Re face a number of risks including exposure to large and catastrophic losses, impact of changes in exchange rates, equity markets and interest rates. The life and health division could be impacted by changes in mortality and morbidity. The company may also be affected by legislation or tax changes.

■ Analyst Certification

Each research analyst primarily responsible for the content of this research report, in whole or in part, certifies that with respect to each security or issuer that the analyst covered in this report: (1) all of the views expressed accurately reflect his or her personal views about those securities or issuers; and (2) no part of his or her compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in the research report.

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UBS Investment Research: Global Equity Ratings Definitions and Allocations

UBS rating	Definition	UBS rating	Definition	Rating category	Coverage ¹	IB services ²
Buy 1	FSR is > 10% above the MRA, higher degree of predictability	Buy 2	FSR is > 10% above the MRA, lower degree of predictability	Buy	36%	32%
Neutral 1	FSR is between -10% and 10% of the MRA, higher degree of predictability	Neutral 2	FSR is between -10% and 10% of the MRA, lower degree of predictability	Hold/Neutral	53%	35%
Reduce 1	FSR is > 10% below the MRA, higher degree of predictability	Reduce 2	FSR is > 10% below the MRA, lower degree of predictability	Sell	11%	29%

1: Percentage of companies under coverage globally within this rating category.

2: Percentage of companies within this rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS; as of 31 December 2004.

KEY DEFINITIONS

Forecast Stock Return (FSR) is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months.

Market Return Assumption (MRA) is defined as the one-year local market interest rate plus 5% (an approximation of the equity risk premium).

Predictability Level The predictability level indicates an analyst's conviction in the FSR. A predictability level of '1' means that the analyst's estimate of FSR is in the middle of a narrower, or smaller, range of possibilities. A predictability level of '2' means that the analyst's estimate of FSR is in the middle of a broader, or larger, range of possibilities.

Under Review (UR) Stocks may be flagged as UR by the analyst, indicating that the stock's price target and/or rating are subject to possible change in the near term, usually in response to an event that may affect the investment case or valuation.

Rating/Return Divergence (RRD) This qualifier is automatically appended to the rating when stock price movement has caused the prevailing rating to differ from that which would be assigned according to the rating system and will be removed when there is no longer a divergence, either through market movement or analyst intervention.

EXCEPTIONS AND SPECIAL CASES

US Closed-End Fund ratings and definitions are: Buy: Higher stability of principal and higher stability of dividends; Neutral: Potential loss of principal, stability of dividend; Reduce: High potential for loss of principal and dividend risk.

UK and European Investment Fund ratings and definitions are: Buy: Positive on factors such as structure, management, performance record, discount; Neutral: Neutral on factors such as structure, management, performance record, discount; Reduce: Negative on factors such as structure, management, performance record, discount.

Core Banding Exceptions (CBE): Exceptions to the standard +/-10% bands may be granted by the Investment Review Committee (IRC). Factors considered by the IRC include the stock's volatility and the credit spread of the respective company's debt. As a result, stocks deemed to be very high or low risk may be subject to higher or lower bands as they relate to the rating. When such exceptions apply, they will be identified in the Companies Mentioned table in the relevant research piece.

Companies mentioned

Company Name	Reuters	Rating	Price
Aegon ^{2a,4b,16}	AEGN.AS	Neutral 2	€10.25
Converium ^{2b,4a,5,16}	CHRN.S	Reduce 2	CHF11.00
Genworth Financial ^{2a,4a,6,16}	GNW.N	Neutral 2	US\$26.55

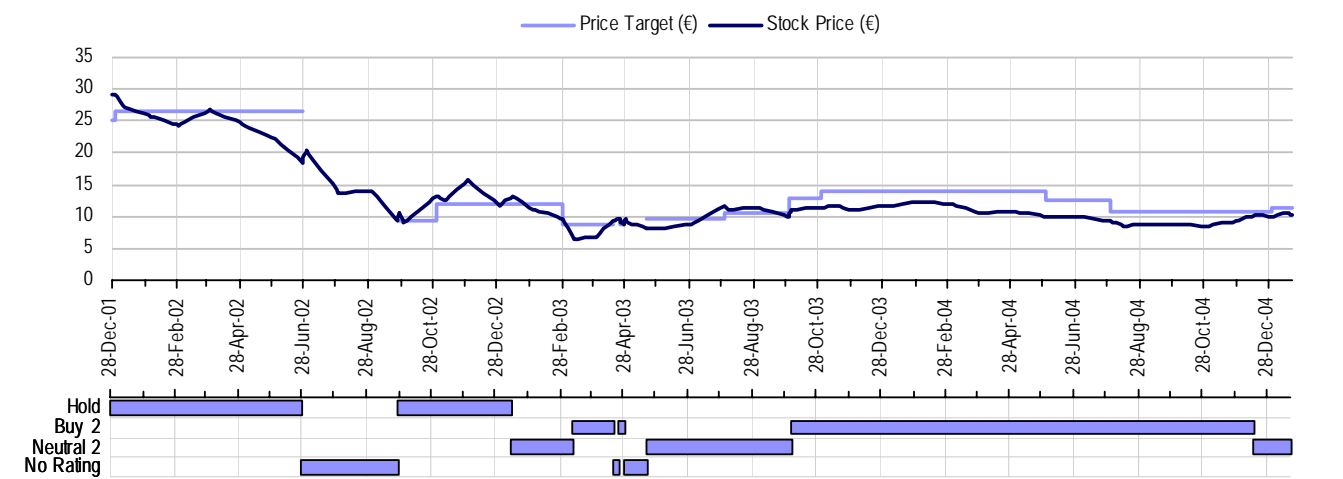
Company Name	Reuters	Rating	Price
Hannover Re ^{4a,16}	HNRGn.DE	Neutral 2	€28.82
ING ^{2b,2c,4a,5,16}	ING.AS	Buy 2	€22.05
Munich Re ^{2b,4a,13,16}	MUVGn.DE	Neutral 2	€89.04
RGA ¹⁶	RGA.N	Neutral 1	US\$48.36
Scor ^{13,16}	SCOR.PA	Reduce 2	€1.48
Scottish Re Group ^{2a,4a,5,6,16}	SCT.N	Reduce 2	US\$24.32
Swiss Re ^{4a,5,16}	RUKN.VX	Neutral 2	CHF82.50

Price(s) as of 19 January 2005. Source: UBS.

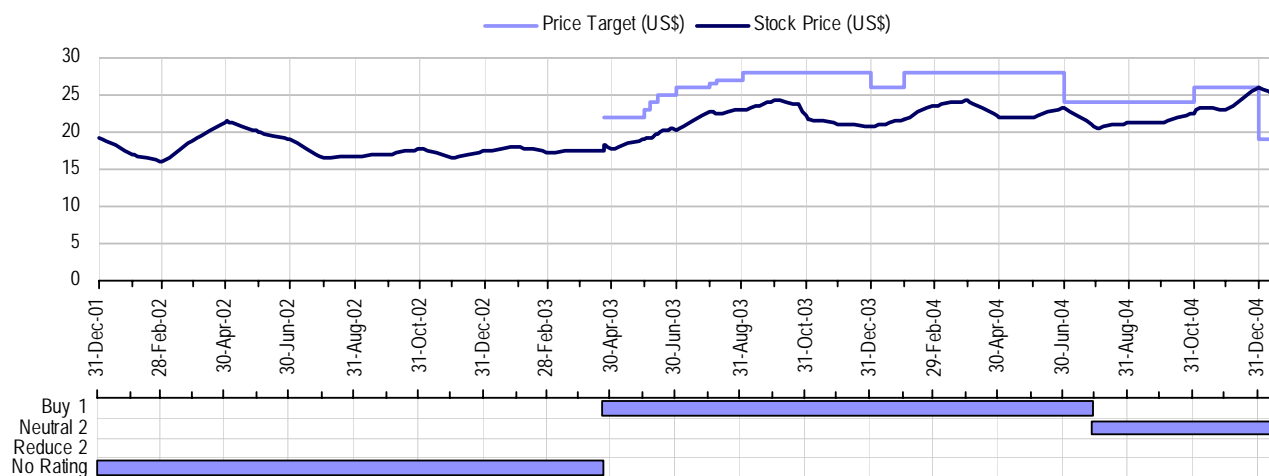
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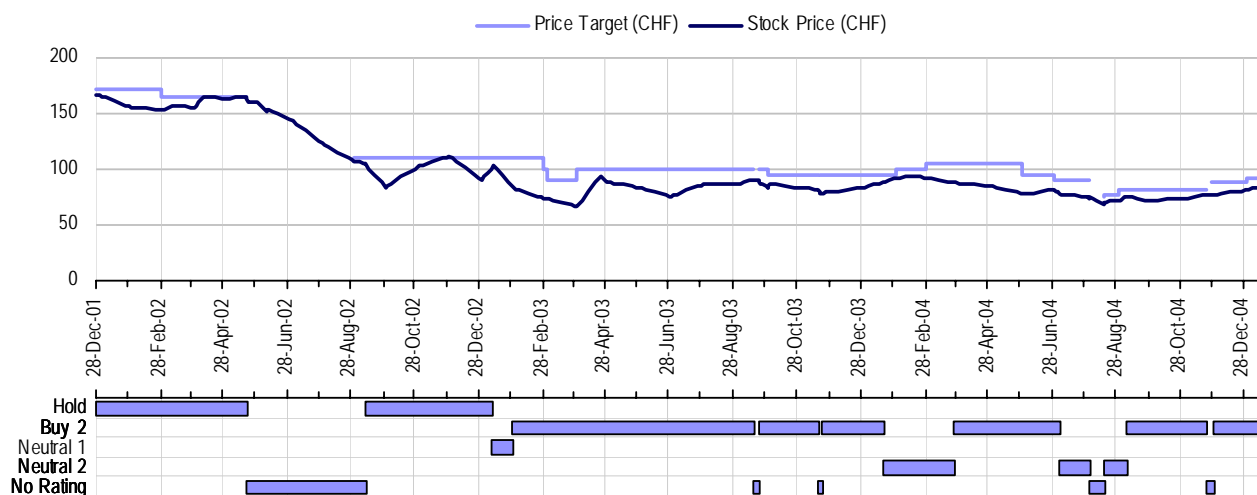
Aegon (€)



Scottish Re Group (US\$)



Swiss Re (CHF)



Source: UBS; as of 19 January 2005.

Note: On October 13, 2003, UBS adopted new definition criteria for its rating system. (See 'UBS Investment Research: Global Equity Ratings Definitions and Allocations' table for details.) Between January 11 and October 12, 2003, the UBS ratings and their definitions were: Buy 1: Excess return potential > 15%, smaller range around price target; Buy 2: Excess return potential > 15%, larger range around price target; Neutral 1: Excess return potential between -15% and 15%, smaller range around price target; Neutral 2: Excess return potential between -15% and 15%, larger range around price target; Reduce 1: Excess return potential < -15%, smaller range around price target; Reduce 2: Excess return potential < -15%, larger range around price target. Prior to January 11, 2003, the UBS ratings and definitions were: Strong Buy: Greater than 20% excess return potential, high degree of confidence; Buy: Positive excess return potential; Hold: Low excess return potential, low degree of confidence; Reduce: Negative excess return potential; Sell: Greater than 20% negative excess return potential, high degree of confidence. Under both ratings systems, excess return is defined as the difference between the FSR and the one-year local market interest rate.

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Head Office: UBS Limited, 1 Finsbury Avenue, London, EC2M 2PP, UK Phone: +44-20-7567 8000

Local Office: UBS Securities LLC, 1285 Avenue of the Americas, New York, NY 10019 Phone: +1-212-713 2000

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