

Current Trends in RISK-LINKED SECURITIZATIONS

by Morton N. Lane and Roger Beckwith

Introduction

Towards the end of the year 2000, any paper describing current trends in insurance-linked (now fashionably dubbed risk-linked) securitization would have been short. There was one trend to describe them: declining—to the point of disappearing—issuance. In November, however, Munich Re and AGF rode to the rescue.

At twelve months end, given our off-calendar summaries of activities (March 2000 to March 2001), the score is not so bad. Given 2001 completion of SR Wind, initiated in March but completed in April, the box score for the last year is:

Pre 3/98	4/98 – 3/99	4/99 – 3/00	4/00 – 3/01
\$886.1*	\$1366.9*	\$1219.4*	\$1126.0*
7 Deals	7 Deals	11 Deals	10 Deals

* \$=million

This table demonstrates a sideways movement of the market size, but our examination of the details reveals continued experimentation in the character of the securities. We also see more peril coverage as Figure 1a and 1b illustrate.

There is, in addition, more use of securitization-techniques in direct underwriting. This does not show in 144A statistics. Deals done by Saab, Rolls Royce and the CEA—arguably securitizations—are not included in the tabulation; neither is the innovative risk swap between State Farm and Tokio Marine. The alternative risk transfer market as a whole appears to be progressing. Specific securitizations are evidently only part of the story.

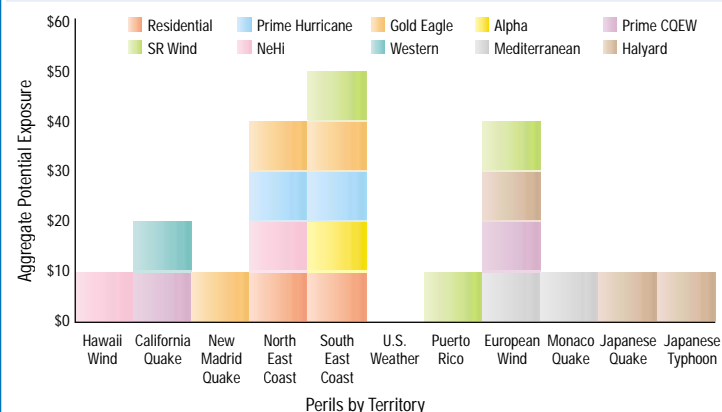
Why did the activity pick up from November on? The answer lies in the firmness of the retrocessional market and the coincidence of year-end renewals. Ever since the French storms Lothar and Martin in 1999, there has been the prospect

Figure 1

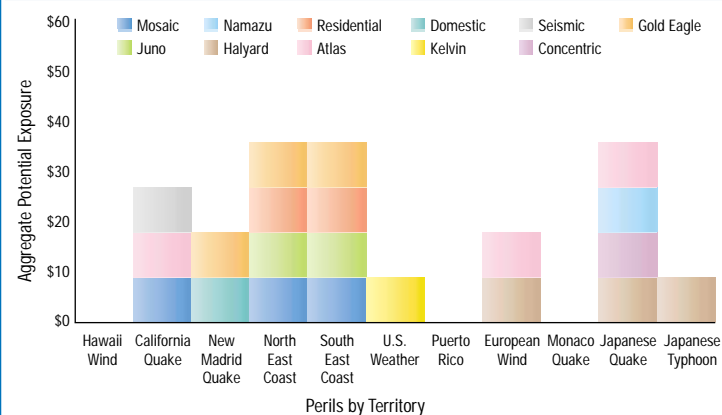
POTENTIAL EXPOSURE

(for an equally weighted securities portfolio)

Potential Peril Exposure for a Portfolio of Ten Equally Weighted Risk-Linked Securities Issued During 2000/2001



Potential Peril Exposure from a Portfolio of Eleven Equally Weighted Risk-Linked Securities Issued During 1999/2000



of a tight market for retro and some reinsurance. In such circumstances, theory would suggest that cedents would want alternative sources of coverage. Capital markets are the scripted source. And for brave issuers, they performed on cue, providing coverage that was cheaper than the existing traditional markets.

In describing current trends we proceed as follows. First, we describe the nature of each separate deal. Second, we identify trends in the character of issuance. Finally, we focus on the perils embedded in the securities and comment on the challenges they pose to prospective investors. Relative pricing is not discussed here.

The Deals

Alpha Wind 2000

This transaction was notable in several respects. It was the first transaction by the State Farm group, which chose to conduct two coverage experiments this year. The other experiment was the risk swap with Tokio Marine. The Alpha deal involved two tranches and cessions from three State Farm Companies to Arrow Re, which in turned ceded to the Special Purpose Vehicle—Alpha Wind.

As we had predicted last year, one noticeable trend in securitization was the issuance of equity tranches in order to avoid consolidation on the part of the ceding company. Typically, these equity pieces are of the order of 3 percent of the deal. State Farm took double precaution, once by ceding to Arrow (the Goldman Sachs transformer) and second by issuing the whole junior tranche (42 percent of the deal) as preference stock.

Rated BB+ by Standard and Poor's, the senior coverage ran for twelve months and involved a portfolio of wind coverages, particularly in Florida. The structure was otherwise a conventional aggregate excess of loss indemnity cover. The senior piece was rather finely priced at the London Inter-Bank Offered Rate (LIBOR) +

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Figure 2

List Of Insurance-Linked (Risk Linked) Securities (March 2000-March 2001) 2000 ILS FINANCIAL STATISTICS

SPV	Cedent	Lead Underwriters	Amount (U.S. \$Mil)	S&P Rating	Moody's Rating
1. Analyzed Securities					
Alpha Wind 2000 FRN	Arrow Re/St Farm	Goldman Sachs/	52.2	BB+	--
Alpha Wind 2000 Pref Shs	Arrow Re	EW Blanch Cap Mkts	37.5	BB-	--
Residential Re 2000	USAA	Goldman Sachs/ Merrill Lynch/ Lehman Brothers	200.0	BB+	Ba2
NeHi	Vesta Fire Ins.	Aon Cap Mkts	41.5	--	--
Mediterranean Re Class A	AGF	Goldman Sachs	41.0	BBB	Baa3
Mediterranean Re Class B	AGF		88.0	BB+	Ba3
PRIME Hurricane	Munich Re	Goldman Sachs/ Lehman Brothers/	159.0	BB+	Ba3
PRIME EQEW	Munich Re	American Re Securities	129.0	BB+	Ba3
Western Capital	Swiss Re	Goldman Sachs/ Swiss Re Cap Mkts	97.0	BB+	Ba2
Halyard Re	Sorema	Aon Cap Mkts	17.0	--	--
Gold Eagle 2001	American Re	American Re Securities/ Lehman Brothers/ Merrill Lynch	116.4	BB+	Ba2
SR Wind Class A-1	Swiss Re	Swiss Re Cap Mkts/	58.2	BB+	--
SR Wind Class A-2	Swiss Re	Lehman Brothers	58.2	BB+	--
2. Equity Tranches of SPV - less than \$10 million					
NeHi	Vesta Fire Ins	Aon Cap Mkts	8.5	--	--
PRIME Hurricane	Munich Re	Goldman Sachs/ Lehman Brothers/	6.0	--	--
PRIME EQEW	Munich Re	American Re Securities	6.0	--	--
Western Capital	Swiss Re	Goldman Sachs/ Swiss Re Cap Mkts	3.0	--	--
Gold Eagle 2001	American Re	American Re Securities/ Lehman Brothers/ Merrill Lynch	3.6	--	--
SR Wind Class B-1	Swiss Re	Swiss Re Cap Mkts/	1.8	BB	--
SR Wind Class B-2	Swiss Re	Lehman Brothers	1.8	BB	--
3. Other Notable Securitization-Like Transactions - Not Part of Pricing Analysis					
Calif. Eq. Auth.			100.0		
Saab AB	Saab AB	Marsh & McLennan	1170.0		
WestLB		WestLB	44.0		
Tokio Mar/St Farm Swap			200.0		
Rolls Royce		XL Financial Solutions			

Notes to Figure 2

- Figure 2 displays securities/tranches that were issued or announced between March 2000 and March 2001. Section 1 shows 13 issues/tranches that are analyzed in this article. Section 2 records 7 equity tranches. Section 3 records related private transactions.

456 basis points. The junior tranche (the preference shares) was priced at LIBOR + 700 basis points.

Residential Re

The structure of United Services Auto-

mobile Association's (USSA) fourth issuance is by now well known. It is the quintessential cat bond. The investor gets 40 percent of USAA's first \$500 million of incurred losses, excess \$1 billion, if and only if the insurer has

Fitch Rating	3/00-3/01 Issue Date	Maturity	Maturity Term	Exposure Term	Spread Premium to LIBOR (bps)	Adjusted Spread Premium (Annual)	Expected Loss	Probability of 1st \$ Loss (Annual)	Probability of Exhaust (Annual)	Expected Excess Return (Annual)	Conditional Expected Loss
--	May-00	May-01	12	12	456	462	0.63%	0.0099	0.0038	399	63.64%
--	May-00	May-01	12	12	700	710	1.46%	0.0208	0.0099	564	70.19%
--	May-00	Jun-01	12	12	410	416	0.54%	0.0095	0.0031	362	56.84%
BB	Jul-00	Jul-03	36	36	410	416	0.70%	0.0087	0.0056	346	80.46%
BBB	Nov-00	Nov-05	60	59	260	264	0.22%	0.0028	0.0017	242	78.57%
BB+	Nov-00	Nov-05	60	59	585	593	1.16%	0.0147	0.0093	477	78.91%
BB	Nov-00	Jan-04	38	37	650	659	1.27%	0.0146	0.0108	532	86.99%
BB	Nov-00	Jan-04	38	37	750	760	1.33%	0.0169	0.0107	627	78.70%
--	Feb-01	Jan-03	24	23	510	517	0.55%	0.0082	0.0034	462	67.07%
BB-	Mar-01	Apr-02	12	12	550	558	0.22%	0.0084	0.0004	538	26.19%
--	Mar-01	Apr-02	12	12	550	558	0.75%	0.0118		483	63.56%
--	May-01	May-05	48	48	575	583	0.68%	0.0107	0.0044	515	63.55%
--	May-01	May-05	48	48	525	532	0.76%	0.0113	0.0053	456	67.26%
--	Jul-00	Jul-03	36	36	450	456	0.93%	0.0100	0.0087	363	93.00%
--	Nov-00	Jan-04	38	37							
--	Nov-00	Jan-04	38	37							
--	Feb-01	Jan-03	24	23			0.82%	0.0082	0.0082		100.00%
--	Mar-01	Apr-02	12	12	700	710	1.18%	0.0118	0.0118	592	100.00%
--	May-01	May-05	48	48	700	710	1.07%	0.0107	0.0107	603	100.00%
--	May-01	May-05	48	48	650	659	1.13%	0.0113	0.0113	546	100.00%
			24								
	Dec-00	Dec-15	180	180		367					
	May-00										
	Mar-00	Mar-05	60	60				Equal Prob.			

- All deals are converted to a 365-day year as LIBOR convention uses a 360-day year but CAT risk is a 365-day year. Adjusted spreads are therefore comparable to reinsurance pricing.
- Expected excess return is defined as adjusted spread premium less expected loss. Conditional expected loss is defined as expected loss divided by the probability of first dollar loss.

suffered this loss as the result of a Class 3 (or greater) hurricane. In exchange, the investor receives (this year) LIBOR + 410 basis points.

Originally issued as a \$500 million security in 1997, the deal size was cut

by more than half to \$200 million last year in a price-validating competition with the traditional market. Absent that cut back, securitization numbers would have continued to grow in both 1999 and 2000.

NeHi

Vesta Fire Insurance Group was the cedent of this Aon transaction, utilizing the on-shore issuing capabilities of the INEX Insurance Exchange. Total size was \$50 million, and it cov-

For brave issuers, the capital markets performed on cue, providing coverage that was cheaper than the existing traditional markets.

ered North East hurricane risk together with tropical storm risk in Hawaii.

AIR, the risk consulting firm, constructed a suitable wind model and investor payout was related to the modeled losses excess \$135 million.

Rated at BB by Fitch, it was issued in two tranches. Like Residential Re, its senior tranche was priced at LIBOR + 410 basis points.

Mediterranean Re

Assurances Generales de France (AGF) is a new entrant to securitization, and its issues provided an interesting structure as it sought to design coverage acceptable to AGF and the capital market investors.

With losses denominated in euros and the issuance in dollars, AGF sought protection from losses due to European windstorms and French earthquakes in both absolute and relative foreign exchange terms. Furthermore, while each of the tranches cover both wind and quake events with a co-reinsurance (or quota share reinsurance) of 65 percent, the first wind event is singled out to have a co-reinsurance of only 35 percent. Why this should be so is not clear. What is clear is that the design was tailored to AGF's needs—affirmation, perhaps, of the specific retrocessional aspects of AGF's inaugural effort.

The tranches were rated respectively, BBB, BB+ and priced at LIBOR + 260 and 585 basis points.

Prime Capital Hurricane Ltd.

Munich Re has been a quiet but consistent player in the risk-linked securitization market. As a sponsor of the Mercury Asset Management Fund

and as basis risk facilitator of Pacific Re, its role has been key. This securitization represents, however, Munich Re's maiden voyage in issuing. According to Manfred Seitz, Munich Re was somewhat disappointed with the size it achieved. Aiming for \$400 million from two issues, Munich Re issued a final total of \$300 million, with \$159 million in Prime Hurricane (plus a further \$6 million Prime Hurricane preference shares). Coming to the market at the annual renewals season, the issuers encountered the worst possible fixed income markets in December 2000. The results were predictable. Annual renewals conflict with market timing. Capital markets welcome reinsurers indeed!

Notwithstanding, the issue was a relative success and was novel in that it focused on very specific territories in Florida and New York. The coverage was for losses occurring after a hurricane hitting any one of the defined gates. Losses to the investor could be for 20 percent, 80 percent or 100 percent of capital depending on the pressure thresholds at each gate. Interestingly, the coverage stopped after one loss with no aggregation or further principal erosion. Aside from industry loss warranty covers (where all principal exhausts the moment touched), this is the first securitization with this one-bite-and-out, single occurrence character.

The rating was BB+ and the price was LIBOR + 650 basis points.

Prime Capital California Earthquake and Euro Wind Ltd.

The companion Munich transaction retains the one-bite-and-out character

of the first one. The underlying risk, however, is for specified northern and southern California gates, defining areas of earthquake risk together with an index for European wind risk. Rated BB+, the issue was priced at LIBOR + 750 basis points.

One of the interesting questions arising from the two Prime deals is whether Munich might have been better served by a combined transaction. We turn to that question in a subsequent section.

Another important observation on the Prime deals is that they used a financial counterparty agreement—a swap—instead of an insurance contract between the cedent and the special purpose vehicle. This appears to be an increasingly important practice.

Western Capital Ltd.

Underscoring the point about financial agreements is Western Capital, which also uses a swap contract. The underlying risk is California earthquake and determination of loss is made via an EQECAT risk model. The structure is otherwise a conventional aggregate excess of loss.

Interestingly, Western replicates almost exactly the risk in the existing issue from 2000—Seismic Re. Secondary market prices of Seismic should have predicted Western's price. They did not. Seismic's original issue price was LIBOR + 450 basis points. One year later, Western's price was LIBOR + 510 basis points. This tiny point of comparison suggests a market hardening of about 15 percent.

Halyard Re BV

This security was originally issued in 1999. It is a small issue on behalf of Sorema. It contains some unusual features. The original term was for four years, but investors were given the right to put the issue back to Sorema annually. Sorema, in turn, held the right to reissue any notes so tendered.

More importantly, Sorema would reprice the note, based on its desired coverage each year, to a fixed dollar attachment point. This has resulted in expected losses falling from 0.64 percent as originally issued to around 0.22 percent. The price has not

dropped proportionally, leading to an apparently very valuable note for original investors.

There are two other explanations for the cheapness. Just as holders have put rights, Sorema has a call that persists each year after any puts have expired. The investor is therefore pricing a call provision into the coupon. Investors probably also demand a premium because of the uncertainty about the next reset. We would guess that the price could be partitioned into equal parts to represent each of these features. Even accepting that, however, LIBOR + 550 basis points still seems very cheap.

Gold Eagle Capital 2001 Ltd.

The third re-issued security in the 2000-2001 list is that of Gold Eagle, issued by Munich Re's U.S. subsidiary, American Re. Originally issued in 1999, this is American Re's second issue. Unlike the original issue, which had two tranches with the second being an industry loss warranty structure, this issue has a single excess-of-loss like tranche. The covered perils are a portfolio of East Coast hurricane covers and Mid-west earthquake risk.

Gold Eagle also uses a swap structure like Western and Prime: rated as BB+ and priced to LIBOR + 550 basis points.

SR Wind Ltd.

The second participation in this year's market by Swiss Re is called SR Wind. It represents two issues: one for French wind and the other for Florida and Puerto Rican hurricane perils. Unfortunately, it follows four months after AGF came to market with the same French wind peril. It also presents the market with a quite complicated structure.

The two notes are individually exposed to each peril, wind and hurricane, separately. However, after a first event, they are linked on a contingent basis. If, say, an eligible French wind event attaches the wind cover (whether or not it exhausts that cover) the limit on the hurricane cover may be added to any residual wind limit to provide for any subsequent eligible French wind events, as well as its

As in conventional fixed income markets, tranching allows access to different parts of the investor market.

originally defined exposure to Caribbean hurricane. Conversely, if the hurricane note is attached first, the French wind limit is available to cover any further hurricanes.

In other words, an investor is exposed to both perils, albeit on a contingent basis, independent of which peril is chosen in the first place.

This "first event for the selected peril, contingent basis for both perils" cover may give Swiss Re the satisfaction that no wasted coverage has been paid for, but it is confusing for investors. Pricing becomes problematic. Ideally, it is a combination of a single occurrence cover price plus a price for a contingent cover on combined perils. An investor with enough French exposure may avoid both notes. As evidence of the problems, the initial price talk had to be raised by 25 basis points beyond the top end of the indicated range.

Other Transactions

Figure 2 details the specifics of all the deals described above including size, rating, price and structure. Also listed are several transactions that were completed during the year on a private basis, for which details are only partially available. Most notable of these were the aircraft leasing programs completed by Saab AB and Rolls Royce Ltd. The Saab deal follows the transaction pioneered by Marsh & McLennan on behalf of British Aerospace in 1999. (Saab is partially owned by BAE.) The contingent liability of aircraft, manufactured by Saab but sold on a lease basis, is removed from the manufacturer's balance sheet. Otherwise, Saab's shareholders would be exposed to the return of aircraft at disadvantageous

times (the lessor's put). Now, for a fee of \$43 million, \$1,170 million of fifteen-year risk has been assumed by reinsuring third parties.

In order to value the lessor's put, an economic model was constructed by RISC Consulting in Boston. This was presumably cross-verified with the reinsurers' and cedents' own analyses. In principal at least, this transaction falls in the class of residual value transactions pioneered by Toyota Motor Credit Corporation in 1998. Notably, in the Saab case, academics from Oxford University were commissioned to study the effect on Saab's stock price. Encouragingly, the actual effect appeared to be positive and dramatic, an immediate increase in price of 20 percent. On a risk-adjusted basis, this was reduced to 15 percent. It is, nevertheless, an excellent outcome when the presence of such off-balance sheet liabilities is generally reckoned to lead to an underperformance of about 10 percent. No doubt we will see more of this class. Let us hope that the details become more public so that other cedents are similarly encouraged to participate.

Another important year 2000 transaction was the five-year swap arranged between Tokio Marine and State Farm. The billed motivation was for both parties to diversify coverage with a trusted partner. State Farm reduced its domestic Mid-west earthquake exposure in exchange for assuming some Japanese earthquake risk. Conversely, Tokio got rid of a growing Japanese quake risk for New Madrid exposure. Interestingly, the measurement was parametric on both sides (who says securitization has not had an influence?) ➤

and was done at zero cost. The identical premiums were set by acceptably identical frequency estimates by both parties. It remains to be seen whether the wider market would swap on that basis alone. Indeed, we have argued elsewhere that risk equivalence is valued based on frequency and potential severity. Regardless, a precedent has been set. Securitization will flourish when there is price transparency, (which is why we were disappointed by the demise of the derivatives market), and swapping risk may be, or become, the next best thing.

Trends

It is a cliché to say that if one is in the forecasting business, it is best to do it frequently. By analyzing trends last year, we made a few predictions of our own. On some we were accurate, on others we were spectacularly wrong. The award winners in each category were as follows. For “the most accurate forecast,” we said that the trend was for increased issuance in lower rated tranches. It was. As far as we can gauge, only one tranche (the senior Mediterranean piece) was rated above BB during our whole analysis period (see Figure 7 and Figure 6). The winner in the “it’s best to be humble” category was our prediction that we would see a slew of contingent covers. None were forthcoming. In Figure 10, we have listed SR Wind as a possibly contingent cover but this stretches the point. No cleanly contingent covers were issued. In the case of SR Wind, the listing is simply to underscore the point that investors should be aware of the contingency wrapped inside that transaction.

Other trends that were examined last year are reviewed again this year. Figure 3 lays out the reference set that is used for comparison. Figures 4 through 12 lay out the details. Comments on each are in order.

Term and Size

Overall issuance was down from the previous year, \$1219.4 million to \$1126.0 million. Issuers continued to

**Figure 3
REFERENCE SET**

PRE - 3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01
RELIANCE I	RELIANCE IV	JUNO	ALPHA WIND 2000-A
GEORGETOWN RE	XL MID-OCEAN	DOMESTIC RE	RESIDENTIAL RE 2000
RESIDENTIAL RE I	RESIDENTIAL RE II	RESIDENTIAL RE III	NEHI
SWISS RE CAL QUAKE	PACIFIC RE	CONCENTRIC RE	MEDITERRANEAN RE
PARAMETRIC RE	MOSAIC I	MOSAIC II	PRIME HURRICANE
TRINITY I	TRINITY II	GOLD EAGLE	PRIME EQEW
RELIANCE II	GRAMERCY	NAMAZU	WESTERN CAPITAL
		ATLAS	HALYARD RE
		SEISMIC	GOLD EAGLE 2000
		KELVIN	SR WIND
		HALYARD RE	
Other Deals (including contingent deals not part of the summary analysis):			
Winterthur	Relliance III Option	Circle Maihama	CEA
AIG	Allianz Option	Clocs	West LB
Hannover	Moderns		Tokio Mar/St Farm Swap
	Sectrs		Saab
			Rolls Royce

use the market, however, for longer-term commitments. Sixty-two percent by value, and 60 percent by number, of deals were for periods longer than the traditional market twelve months. As previously observed, we feel this is partly due to the economics of the securities transactions issuance procedures but also due to demand on the part of investors for longer-term transactions. Average deal size stayed around \$100 million much to the disappointment of Munich Re.

Credit

As already remarked, nearly all deal flow was directed at the subinvestment-grade BB level. This put the issuers in direct competition with the high yield market. And here the story is really quite remarkable.

The year 2000 was the worst market for high yield bonds (“junk” in impolite circles) in a decade. Yield spreads started widening in early 2000 and did not stop until the Fed’s interest rate cut in early 2001.

Prices of junk were off by 10 percent to 15 percent. During this whole period, primary issue and secondary market risk-linked note prices stayed remarkably firm. Indeed, we think they should have declined, not because of interest rates but because of a firming reinsurance market. The fact that they did not may tell a tale of acceptance by

investors and an appreciation of their diversifying virtues. If that assessment is correct, we should see a continued closing of spreads relative to comparable junk in the upcoming years.

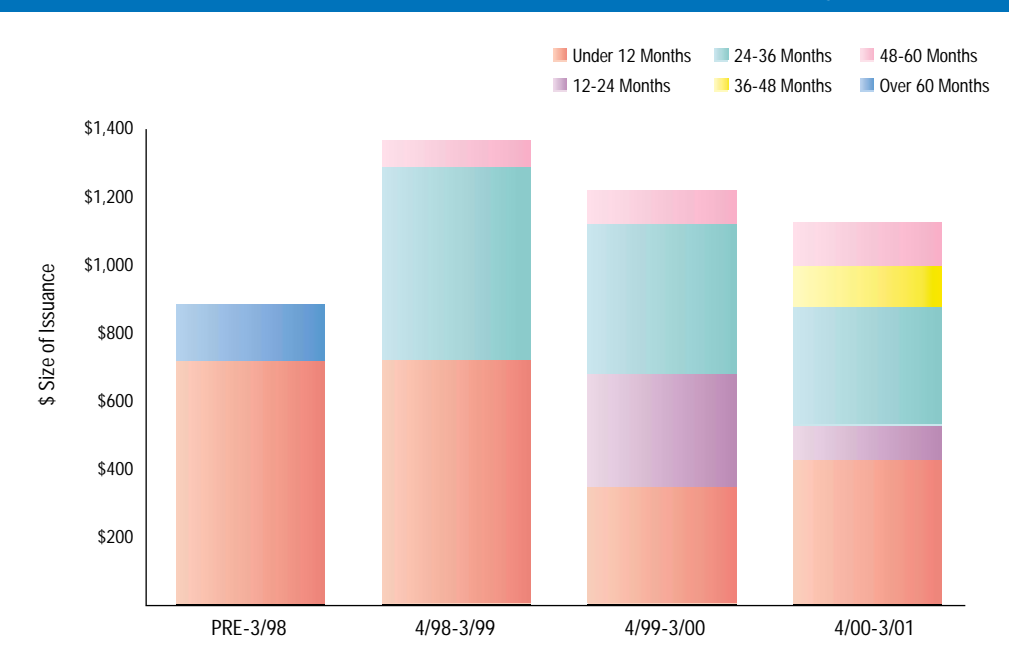
Another feature of last year’s market was a hardening of rating agency attitudes to assessing risk-linked securities. At the recent, very successful Bond Market Association (BMA) meeting in Miami (March 2001), Moody’s made it clear that it rates on the basis of expected loss estimates for insurance notes and corporates alike. Standard and Poor’s made it equally clear that it rates to probability of first-dollar loss. (Fitch says it makes adjustments to expected loss to allow for frequency, but in unspecified, judgmental ways.) We believe that rating on frequency is a problem for the market. It is OK as long as all securities have similar contingent distributions, as is arguable for corporates. But it is assuredly not the case for insurance-linked instruments. Munich Re says that it did not combine its two issues because of a potential lower rating.

If the agencies are to be taken literally, a combined-deal S&P rating would have been lower, had the combined-deal contained sublimits identical to those actually achieved in the market. However, the combined cover should not have affected expected loss if the individual sublimits were main-

Figure 4
TERM TO MATURITY (where possible, exposure, rather than maturity)

Maturity (in Months)	Amount in \$ MILLIONS					Number of Deals				
	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL
12	717.6	720.6	345.7	427	2210.9	5	5	3	4	17
24	0	0	332.1	100	432.1	0	0	2	1	3
36	0	566.3	441.6	350	1357.9	0	1	5	3	9
48	0	0	0	120	120	0	0	0	1	1
60	0	80	100	129	309	0	1	1	1	3
100	168.5	0	0	0	168.5	2	0	0	0	2
TOTAL	886.1	1366.9	1219.4	1126	4598.4	7	7	11	10	35
AVERAGE DEAL SIZE	127	195	111	123						
% LONGER THAN 12 MONTHS:	19%	47%	72%	62%		29%	29%	73%	60%	

Figure 5
TERM TO MATURITY (where possible, exposure, rather than maturity)



that, nor do we wish to take away their due. Equally, the stated figure does acknowledge other important participants in the market, and they also deserve their due. A restated Goldman record for 2000 is that it led six out of ten deals last year, and this represents 73 percent of the dollar issuance. Its numbers as book-runners is perhaps its most flattering statistic, but it is not publicly available.)

More important observations are buried in the control statistics of Figure 8. First, several early-issuing managers, ourselves included, have failed to follow through and continue to utilize the market. Only half of those who have ever appeared were in attendance

tained as issued. Therefore the combined deal would not have affected a Moody's rating.

We believe this problem will come back to haunt the market and, unless it is satisfactorily resolved, will actually inhibit market growth.

Market Control

The balance of power between investment bankers and reinsurance inter-

mediaries appears to have remained steady. Investment bankers controlled two-thirds of the issuance market. Goldman Sachs, the market leader, has 31 percent of the citations of co-manager listings.

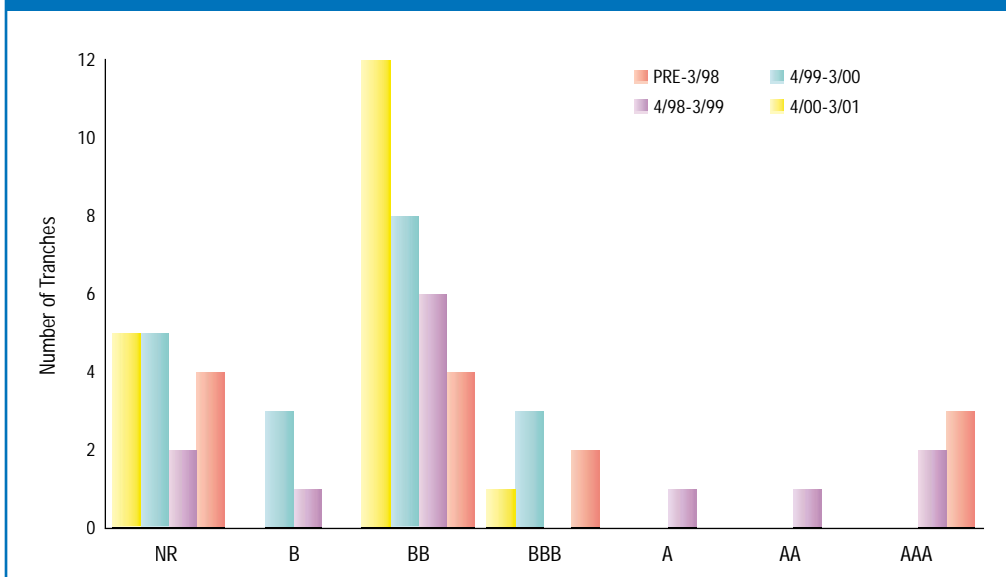
(Several times during last year it was observed that this particular statistic was unfair to Goldman. Its position was more dominant than 31 percent. We have no quarrel with

during 2000-2001. Second, among the reinsurers category, it is the reinsurers' capital market subsidiaries that are continuing to play. Am Re and Swiss Re Capital Markets divisions do more than Marsh & McLennan, Aon and Blanche combined. No doubt both intermediaries do scads of private transactions, but one is left with the question: Is their absence due to economics (it does not pay) or politics

Figure 6
CREDIT RATINGS (by Tranche)

	Amount in \$ MILLIONS				TOTAL	Tranches				TOTAL
	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01		PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	
AAA	230.3	23	0	0	253.3	3	2	0	0	5
AA	0	60.7	0	0	60.7	0	1	0	0	1
A	0	283.1	0	0	283.1	0	1	0	0	1
BBB	82	0	173	41	296	2	0	3	1	6
BB	515	869.1	773.4	1057.9	3215.4	4	6	8	12	30
B	0	21	141.6	0	162.6	0	1	3	0	4
NR	58.7	110	131.4	27.1	327.2	4	2	5	5	16
TOTAL	886	1366.9	1219.4	1126	4598.3	13	13	19	18	63
AVERAGE TRANCHE SIZE	68.2	105.1	64.2	62.6						
% OF ISSUES BELOW INVESTMENT GRADE	65%	73%	86%	96%		62%	69%	84%	94%	
DOWN GRADES OR WATCHES	NONE	NONE	HALYARD RE (SOREMA)	NONE						
LOSSES	NONE	NONE	RELIANCE IV GEORGE-TOWN RE	NONE						

Figure 7
RATINGS OF RISK-LINKED CHANGES OVER TIME (by number of rated tranches)



(we need to feed our clients directly)? Either explanation is not good for those concerned with the market balance of power. If the market does flourish, it will be the investment bankers who will win. The intermediaries may have already ceded the field.

Structure

Multiple tranche structures now clearly dominate the issuing scene. It makes sense. As in conventional fixed income markets, tranching allows access to different parts of the investor market.

Also evident is the issuance of equity tranches in order to be in conformance with accounting and Securities and Exchange Commission nonconsolidation

Figure 8
COMANAGERS (as listed on PPM - there may be multiple comanagers per issue)
 Ranked by \$ Amount of issue

	AMOUNT IN \$ MILLIONS					NUMBER OF CITATIONS AS COMANAGER				
	PRE-3/98	PRE-3/98	PRE-3/98	PRE-3/98	TOTAL	PRE-3/98	PRE-3/98	PRE-3/98	PRE-3/98	TOTAL
GOLDMAN SACHS	729.1	1176.9	1052.4	819	3777.4	4	4	9	6	23
LEHMAN	477	500	450	740	2167	1	1	3	5	10
MERRIL LYNCH	477	500	217	320	1514	1	1	2	2	6
AM RE*	0	0	182.1	420	602.1	0	0	1	3	4
AON*	0	80	317	67	464	0	1	4	2	7
SWISS RE*	237	0	0	220	457	2	0	0	2	4
MARSH*	0	0	300	0	300	0	0	2	0	2
BLANCHE*	0	54	45.7	90	189.7	0	1	1	1	3
CHASE	83.6	56.6	0	0	140.2	1	1	0	0	2
CENTRE*	83.6	56.6	0	0	140.2	1	1	0	0	2
DLJ	83.6	56.6	0	0	140.2	1	1	0	0	2
ZURICH*	83.6	56.6	0	0	140.2	1	1	0	0	2
CSFB	137	0	0	0	137	1	0	0	0	1
LANE FINANCIAL*	20	10	0	0	30	2	1	0	0	3
SOC GEN	0	0	0	0	0	0	0	0	0	0
TOTAL	2411.5	2547.3	2564.2	2676	10199	15	13	22	21	71
Goldman Sachs' Share	30%	46%	41%	31%		27%	31%	41%	29%	
Reinsurers And Intermediaries	18%	10%	33%	30%		40%	38%	36%	38%	
Investment Bankers *insurers	82%	90%	67%	70%		60%	62%	64%	62%	

requirements. Actually, the most elegant solutions are those utilized by State Farm and NeHi, where equity includes large junior tranches issued as preference shares rather than the now traditional, thin, accommodating slivers of equity. Of course, this solution requires acceptance of those shares in the market place. It also implies a more real market price rather than the accommodation price that might accrue to slivers of equity. In the tables we choose to classify Alpha A as a tranche rather than equity.

Index deals, whether modeled or parametric, seem to be used increasingly at the expense of indemnity transactions. In 2000, 77 percent by value and 70 percent by volume were index based.

Most deals are now portfolio deals rather than single peril bonds, 65 percent by value and 70 percent by volume. We have argued that this may

become the case for several years, but it has emerged slowly and in different form than expected.

As is evident from our classifications, we had expected portfolios with sublimits by class or event. Instead we have portfolios by occurrence. This trend requires a more detailed description, which we provide in the next section.

A Look Under the Covers

The USAA bond is the quintessential cat bond. Its pay-off is like an option or an aggregate excess of loss cover. A loss is occasioned by a hurricane exceeding the specified magnitude, and then the particular losses are aggregated to provide the extent of USAA's losses. Each (perhaps highly correlated) loss is from a policy that is limited in scope, relative to the limit of exposure. Whereas a single event aggregation could exhaust the limit, no single

component loss could.

The loss structure in Prime is different. The loss is modeled for several defined gateways, and is a single occurrence class. An event in any one of these gates could exhaust the limit by itself. Therefore, the probability of occurrence of a loss is the sum of the individual probabilities. Statistics 101 for us nonactuaries says probability of disjoint events A or B equals probability of A plus probability of B. Accordingly, in Prime Hurricane the probability of a hit in the New York gate is given as 0.54 percent and in the two Miami gates as 0.93 percent. The chance of a hit in either New York or Miami is 1.46 percent.

In investor presentations, since the payout function is the same for both gates, the relative expected loss contribution is sometimes shown in pie charts with 37 percent of expected loss from New York and 63 percent

from Miami. This is a completely accurate representation. But let there be no mistake: a 100 percent loss can come from either gate. The structure is not sublimited to the fractions of 37 percent and 63 percent expected loss in each gate.

Similar statistics underlie several of the other deals discussed here. Individual classes of loss can exhaust the full limit by themselves. Often these either/or covers are split into two, e.g., Prime, SR Wind.

As already indicated, what surprises us is that the two pieces are not combined. Consider the two Prime transactions from Munich's point of view. Effectively, it issued \$300 million worth of notes with possible recoveries from either New York gate or Miami gate or Northern California gate or Southern California Gate or the European Gate, but in no case would the recovery exceed \$165 million from the first two gates nor would it exceed \$135 million from the last three. It has de facto sublimits to its issue by splitting it into two.

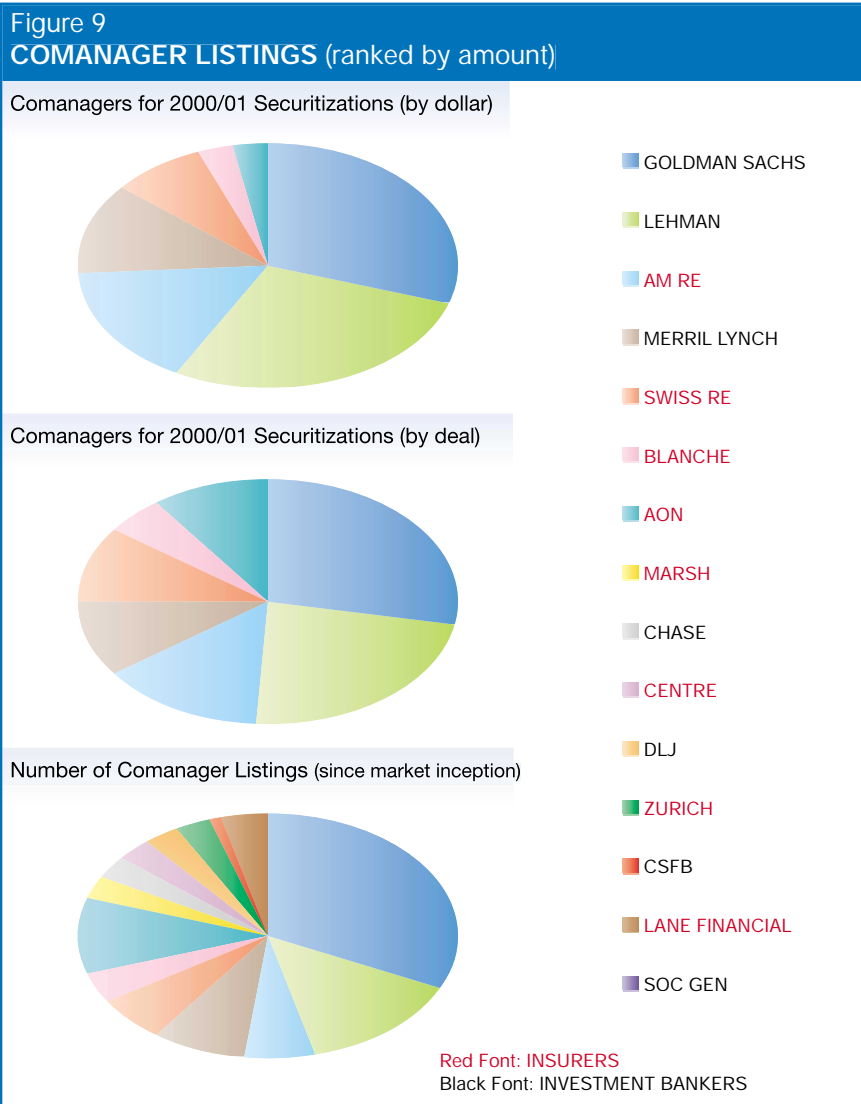
Question: Could it have done better by issuing the two Primes as a single issue? It would make a big (increasing) difference to the probability of attachment, but it would also make a big (declining) difference to the probability of exhaustion. The expected loss of the combined cover would simply be a weighted average of the two. Moody's would rate the combined issue the same as before, S&P would rate it as lower grade.

There we go again, so to speak.

We would argue that investors ought to prefer the combined cover because of its in-built portfolio effect. Further, investors should eventually pay extra for it. (Of course, if presented with the opportunity to self-assemble at better prices, investors will always do that.) Perhaps the decision to split the deals was driven by a desire to service existing investors rather than appeal to new ones that might prefer the ready-made book.

If we are correct about a better deal, then one way to prove it would be to arbitrage the issue.

A final comment on structure: any



remarks made about the Prime deal apply equally well to the SR Wind, but a combined bond would be sublimited by event rather than line.

Perils

In Figure 1 we displayed the potential peril exposure of a buyer of every 2000-2001 deal. With ten securitizations, it could invest 10 percent in each. If it did so, it would run the risk of peril accumulation. The color-coding of each security shows the peril contained in that deal. NeHi, for example, has Hawaii and the North East storm risk. Clearly, since no other deal covers Hawaii, the worst storm there could cause a 10 percent loss of portfolio principal.

On the other hand, a direct hit in

the right part of Miami could cause a portfolio loss of principal of 50 percent. Five deals could be wiped out: Prime, Alpha, Residential, SR Wind and Gold Eagle. They all contain Florida hurricane risks.

Because of this, a security purchaser would be unlikely to buy all the Florida-exposed deals in the same amount. It will try to control accumulations, just as traditional reinsurers do. This aspect of insurance-linked securitization has not been paid sufficient attention. In the rush to make risk-linked securities accepted, emphasis has been put on similarities to other fixed-income securities, without examining the differences. And yet that is what makes them interesting. The problems of accumulation in in-

Figure 10 OTHER TRENDS
CLASS BY STRUCTURE

	Amount in \$ MILLIONS					Number of Deals				
	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL
CAPITAL PROTECTED	267.8	18	0	0	285.8	4	1	0	0	5
SINGLE TRANCHE*	206	590	722.5	759.9	2278.4	5	3	7	7	22
MULTIPLE TRANCHEs	388.2	758.9	465.5	335.4	1948	2	4	4	6	16
"EQUITY" PIECES**	24	0	31.4	30.7	86.1	1	0	4	7	12
TOTAL	886	1366.9	1219.4	1126	4598.3	12	8	15	20	55

* May be combined with a capital protected tranche.
**Capital in excess of 3% minimum requirement is considered to be a separate tranche.

CLASS BY UNDERLYING RISK

	Amount in \$ MILLIONS					Number of Deals				
	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL
SINGLE	797.6	1200.3	667	390	3054.9	4	4	6	3	14
PORTFOLIO	0	0	45.7	616	661.7	0	0	1	6	1
PORTFOLIO (with sublimits by line)	88.5	10	0	0	98.5	3	1	0	0	4
PORTFOLIO (with sublimits by event)	0	156.6	506.7	120	783.3	0	2	4	1	6
TOTAL	886.1	1366.9	1219.4	1126	4598.4	7	7	11	10	25
% OF ISSUES WITH A SINGLE RISK	90%	88%	55%	35%		57%	57%	55%	30%	

CLASS BY INDEMNITY/INDEX

	Amount in \$ MILLIONS					Number of Deals				
	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL
INDEMNITY	629.1	1356.9	642.7	357	2985.7	3	6	6	4	19
INDEX	257	10	576.7	769	1612.7	4	1	5	6	16
TOTAL	886.1	1366.9	1219.4	1126	4598.4	7	7	11	10	35
FRACTION OF INDEMNITY DEALS	71%	99%	53%	32%		43%	86%	55%	40%	

OTHER DEALS, INCLUDING CONTINGENT DEALS

	Amount in \$ MILLIONS					Number of Deals				
	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL	PRE-3/98	4/98 - 3/99	4/99 - 3/00	4/00 - 3/01	TOTAL
CONTINGENT: EQUITY (LA SALLE, HORACE MANN, RLI)	450					3				
CONTINGENT: DEBT (NATIONWIDE, ARKWRIGHT) (MAIHAMA, REAC)	300		175			2		2		
CONTINGENT: REINSURANCE (RELIANCE III, ALLIANZ) (SR WIND?)	170		120				2		1?	
TOTAL	750	170	175	120?		5	2	2	1?	

Figure 11
POTENTIAL PERILS

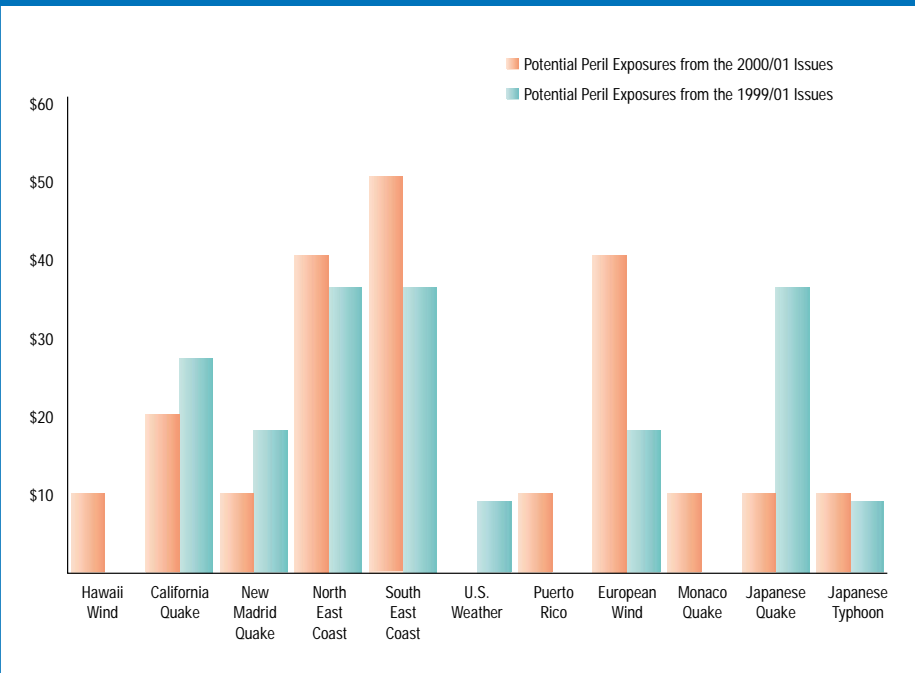
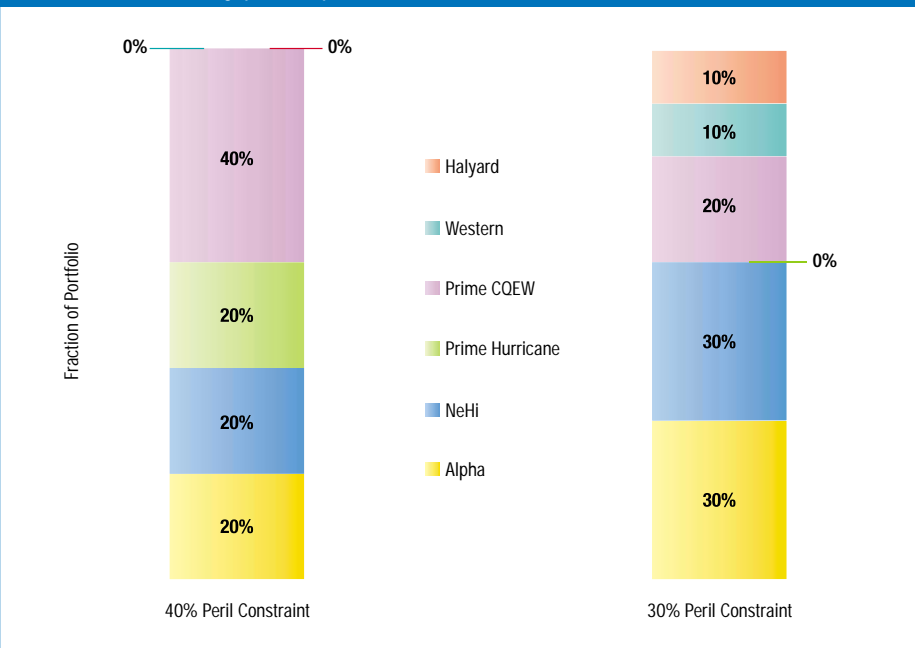


Figure 12
"OPTIMAL" (COUPON INCOME) PORTFOLIOS
(when constrained by peril exposures)



insurance-linked securities are no different in principal from the problems of correlation in, for example, CDO portfolios. Neither market handles the problem with distinction. Both use rules of thumb (diversity indices and defined pillars of risk) and both can do with more analysis and discussion.

Figure 11 shows potential exposure in the issues of both 1999-2000 and 2000-2001. Clearly, the changes from year to year are as follows: more European wind demand in 2000-2001, less demand for Japanese quake and continued demand for hurricane coverage.

This analysis is by no means sophisticated. There is no allowance for the likelihood of totaling each deal. Nor does it show the reward for taking the risk. Finally, the definition of the various perils is not very refined. Nevertheless, Figure 12 is revealing. It is a beginning of another trend that we hope to analyze more extensively in the future.

By way of illustrating the importance of perils, consider Figure 12. It shows the deal composition of two optimal portfolios if those portfolios were designed to (a) maximize coupon income, while (b) restricting exposure to either 40 percent or 30 percent by any one peril. We are definitely not recommending that as an appropriate criterion, merely illustrating that the portfolio design can have quite an important effect on deal selection. The more conservative investor, i.e., the one prepared to take the least peril exposure, will need to hold a greater number of securities in his portfolio. This is diversification though pure correlation analysis. Any reinsurer worth its salt could have told us that. But it is the effort to capture that experience-won wisdom that causes us to resist the immediate jump to mean-variance analysis conventional investors require. Insurers may be able to teach the capital markets crowd a thing or two. Then again it is not all one-way traffic. Further analysis will follow in due course.

Concluding Remarks

This evolving market continues to absorb our interest and presents us with lots of intriguing questions. It is an interest that has not, to date, repaid such affection. But we continue to believe that important lessons can be learned by diligently following a risk market that may hold the key to many more risk transfer transactions.

Ask questions about alternative risk financing through securitization in the "Reader Forum" at rmmag.com.