WHAT KATRINA HATH WROUGHT

By: Morton N. Lane, President

It is now more than four months since those three wicked witches of the west, Katrina, Rita, and Wilma, devastated the Gulf of Mexico and its surrounding coast line. Collectively, according to Property Claims Service (Nov. 28), these storms caused over $50 billion dollars worth of insured loss and multiples of that in non-insured losses. And, just as the physical landscape has changed but is slowly recovering, the financial landscape in the world of insurance has shifted and is being repaired. Insured losses have rippled and are rippling through the primary insurance market, the reinsurance market, the retrocessional market and the hybrid market (i.e., cat bonds, insurance-linked securities, industry loss warranties and the like). Keeping track of these changes is not easy, but it is important.

Predicting the shape of things to come as a result of change is, hopefully, easier than forecasting a storm track, but the consequences for participants in any of these markets can be just as severe.

Perhaps the most remarkable feature of this year end is how quickly the reinsurance markets have repaired themselves in order to be able to assume the January 1 renewals. It is a fair guess that regulated markets (insurance) will take longer to rehabilitate themselves. Talk is emerging of government-private market solutions to improve things in the future. Based on the evidence of the last four months the best
government-private market initiative may be to take down some existing regulation (premium caps?) rather that erect new cooperative structures. But that argument is for the future.

Our objective in this paper is to describe the story as it has emerged so far. Although our longer term interest is in the hybrid market, much is more visible in the traditional markets. We take each in turn starting with the reinsurance market. We do not address much of the effects in the primary market, since as we have already implied, price change is more regulated and much property insurance is written by multi-line insurers where catastrophe effects are consequently more muted.

The Reinsurance Market

Many reinsurers are publicly traded corporations. Tracking the price of their stock is therefore a vital insight into the losses suffered and price predictions going forward. Therefore, on page one we update the chart of daily price shifts given in our post-Rita report (Unlovely Rita’s Market Meter, Sept. 25). All prices are normalized at 100 the day before Katrina struck. What is noticeable about the reinsurer prices is that they have finally begun to turn up. Frankly, it took longer to happen than we expected. The pattern established after the World Trade Center loss was a dramatic price decline followed by a rising trend. At the time of the WTC loss the time from loss to turnaround was about three weeks (see inset); this time it took eight. On reflection, the reason for the long delay between bottoming out and rallying was the hurricane season itself. With high surface temperatures in the Gulf, the market decided “it’s not over ‘til it’s over”. But after that, around official season end, Oct. 31, and with the PCS publication of Wilma’s loss (Nov. 28), the market for reinsurer stocks began to rally. Even the official deadline was not without it’s moment of giving pause when Hurricane Epsilon was named on Dec. 2nd and even more extraordinarily TS Zeta was named on Dec 30th.

It has been our contention that the decline in stocks from loss event to market bottom represented the markets’ estimation of the size of the loss on the average reinsurer, whereas the specific decline of a stock represented the loss estimate for a particular reinsurer. Thus, while the stock of PXRe and Montpelier fell by 50% and 55% respectively, the average (unweighted) decline between Aug. 26, the day before Katrina hit, and Oct. 30 was 17.3%. Of course, that number represents loss of income and impairment of franchise value (perhaps through downgrade) as well as actual estimate of the catastrophe loss.

This seems about right given other estimates. Benfield’s in their third quarter review of losses suggests that the sixteen companies they track lost 8% of their end 2004 equity value as of December 2005, i.e., wiping out any mid-year income. Guy Carpenter in their Reinsurer Impact Update put the size of loss at about 13% of the mid-year estimate of equity on their survey of 53 reinsurers. Interestingly, Guy Carpenter also recorded the industry loss estimates consistent with declared losses. It is approximately $45 billion. Since the current PCS total for the three storms has been revised to about $50 billion, both estimates may need to be further revised. The market may have already anticipated same.

Neither Benfield’s nor Guy Carpenter locate exactly in which market sector losses will fall – insurers, reinsurers or retrocessionaires, but there is a feeling that it will fall most heavily on the reinsurers, especially on those with heavy commercial lines. There is also a feeling that many insurers have blown through their reinsurance programs. Fitch ventured the distribution of losses on Oct 14, i.e. pre-Wilma, to be as shown in the diagram below. If, indeed, “programs have been blown” the fraction
going to Primaries will have to be grossed back up. We have taken the liberty of adding a retro allocation, since that market has taken large losses, but whose size remains indeterminate.

Fitch estimate of distribution of losses ($bns) from Katrina ($30-$50) and Rita ($3 - $6) as of Oct. 14, 2005. (Retro estimate added by LFC)

Primary Insurers $18 - $29

Reinsurers $15 - $27

Retro $5 ??

Reinsurers Stock Rally

If the drop in stock price represents the market’s estimate of loss, the rally in the market is the market’s measure of opportunity going forward. In short, the prospects for higher premiums. Why else bid up the price of the stock? Here the message seems equally clear. The rally since the October bottom averages about 40%.

In other words, we believe the market is saying that premiums going forward are likely to be 40% higher than the premium levels prior to Katrina. Now just as the loss estimate is a combination of factors including catastrophic losses, so the size of the rally is a combination of factors in addition to pure premium increase. This could include recovery of franchise value as well as higher dividends, etc. Also, as we have suggested once before, a more complicated way to view insurer/reinsurer stocks is as the equivalent of fixed income bonds with a modified duration of, say, 10. If this were the case, a 40% increase in prices would be the result of premiums rising by 400 basis points on average. Simpler, perhaps, to say a 40% rise in stock prices shows upwards of a 40% rise in premiums.

Another feature of the stock price story is, as the graph on page 1 shows, the biggest rallies have taken place in those companies whose prices dropped (i.e. were hurt) the least after Katrina. In this case ACE and Swiss Re. Conversely, the smallest rallies have taken place in those hurt the most; Montpelier, PXRe and IPC. It seems to us that in this case the market is assessing the ability of the companies to recover from the catastrophic losses and benefit from the hard market. Montpelier, PXRe and IPC are all retrocessional players and all have big losses. On the other hand, the retrocessional market is expected to be the hardest going forward. Why not a bigger rally? It is likely that the market is suggesting two things: franchise impairment and legacy issues. In other words, do they have the ability to take advantage of the market and is the true nature of the losses fully developed? If there is an overhang of adverse development why invest in an existing but tarnished vehicle? As we see below capital is pouring in to take advantage of the new market in both new and old vehicles.

Raising Capital

The story of new capital raising is illustrated in the graphic and table shown below. As of year end, over $20 billion of new capital has been raised. The figure is from published news reports of capital raising intentions, and while it has been cross checked from several sources, it must be recognized at best as an estimate of true activity. Many private initiatives are not recorded here.

The $20 billion in new capital was almost equally divided between existing firms and new
start ups. Existing firms were first to raise capital – the Blue Ribbon goes to PXRe - but after several weeks new firms were formed – Blue Ribbon to Chubb Re’s Harbor Point. The slowness of new firms to form may have been an Elliot Spitzer effect. In previous new capital formation markets - Class of 1993 and Class of 2000 - reinsurance brokers, in particular Marsh and McLennan, were sponsors of new ventures. However, such entities were perceived by Spitzer at least to contain conflicts of interest. Only Benfield’s seem to have been as active this time round.

The graph seeks to show the form of capital as well as its amount. Again, the numbers are estimates but some clear trends seem to have emerged. In particular, the capital raised via the Trust and the hybrid markets is significant. The distribution is roughly as follows.

<table>
<thead>
<tr>
<th>Existing Reinsurers</th>
<th>Start ups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>Trust Preferreds</td>
</tr>
<tr>
<td>78%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Our 2005 review article “Game On!” discussed the rise of Trust Preferreds as a form of equity-like financing. It now forms part of nearly every financing plan by both existing and start up companies.

The capital formation story is not exclusively positive. By year-end at least two plans were withdrawn, Beazley 3 and Castellum Re. In general, it is said that all new firms encountered difficulties arranging staff and structure. Capital was plentiful, labor was not, for old time capital/labor economists. Nor were the support facilities in Bermuda easily obtained. It remains to be seen if other centers will emerge or other firms will withdraw.

**Rating Agency Actions**

Of importance to investors in either new or old reinsurance companies are the actions and attitudes of rating agencies. Several expressed themselves during this period. Of course, several downgrades took place; AAA is indeed rarified air these days. In other actions, ratings were
affirmed especially after new capital was raised. AM Best went to the trouble to publish a piece detailing how new start-ups would be evaluated. Capital was obviously important but the five year plan and the experience of the executive team were highlighted. S & P weighed in with similar concerns. Clearly, not all start-ups were going to start with an A+ and many considered that A- was the least a new start-up should aim for.

Fitch took in some ways a bolder step. It said that henceforth its capital requirements would be driven by considerations of Tail Var (a.k.a. TVar or CVar). Essentially, they are going to pay attention to all points on the tail of the exposure distribution rather than just capitalizing to the Var point. The effect of this is illustrated in the diagram below. At the one-in-a-hundred point, the capital requirements of TVar vs. Var is between 20% and 30% higher. Going forward the rating agencies were going to require more capital, 25% more, to support the same level of risk. Investors will immediately interpret this as saying that business plans that previously promised expected returns on capital in the mid
twenties could now expect returns in the high
teens.

The ILW Market

One sector of the hybrid market that
experienced significant activity during 2005 was
the “industry loss warranty” (ILW) market. For
the un-initiated, this market trades dual trigger
options – one industry loss based, the other
indemnity based – that are binary in pay-off. Typically, the industry loss dominates. Most
outstanding US Wind exposed ILWs were
triggered during 2005. According to Enda
McDonnell of Access Re, recoveries from the ILW
market during 2005 could be as much as $1
billion. Obviously, if there is further
development of industry losses this could get
even higher.

In the immediate days during and after
Katrina and Rita hit, the ILW market traded in
“Live Cats” (giving last minute protection when
the hurricane was on the horizon), “Dead Cats”
giving ex post protection for size of the loss) and,
finally they traded in “back-up covers” which
gave protection through the end of the year for
those who had blown both initial and reinstated
cover. In many ways the ILW market is the true
successor to the Cat options experimentally
traded during the mid 1990’s at the Chicago
Board of Trade.

Of particular interest is how premiums in
the ILW market have moved. The picture is
shown in the two diagrams below. The first
shows that premiums from 2004 and presently for
different levels of industry loss for Florida Wind
exposed ILWs. The second shows the same shift
using AIR’s 2004 expected loss levels. Both show
shifts in premiums of approximately 35%. This
confirms, or at least is somewhat consistent with,
the view of the equity markets.

We do not detail specific prices here, but
we have recorded the price shifts in table form,
see two tables below. Of particular interest is
how much of the shift in premium is caused by a
perceived shift in risk versus a shift in the cost of
risk capital. It is hard to separate, but no doubt
both effects apply. A partial insight can be gained
by distinguishing between the effects on
earthquake premiums versus the effect on wind
premiums. It would appear that more than one
ILW Premium vs Expected Loss
2004 vs. year end 2005
Florida Wind
Probability indications pre-Katrina AIR 2005 single event curve

Shift in ILW Premium
2004-2005
- Florida Wind
approximately 30%
half the premium shift is due to risk capital cost since there is no particular reason for Katrina et al, to have caused perceived shifts in earthquake risks.

Another insight in the tables is the massive increase in the more remote risks. Second event covers as detailed here have shifted by some 100+%. Similarly, the high layers of industry loss have increased by much more than the lower levels. Why so?

One is reminded of the nursery rhyme “three blind mice” where reinsurers take the role of the mice and the rating agencies takes the role of the farmer’s wife – remember she cut off their tails with a carving knife. Here the tails are statistical and the carving knife would appear to be CVaR knife and its non-quantitative ilk. Because reinsurers are having to manage their tails much more precisely, they are paying up to protect against remote risks which would otherwise push up their tails. Indeed, anecdote has it that several companies had to pay for significant chunks of 2006 ILW coverage in order to get rating agency blessing for their go-forward activity. Not that these companies are the first to find utility in the ILW market. A close reading of the third quarter record shows that several companies had to revise their loss estimates down (income up) just after PCS announced its Katrina loss ($34 billion in October). Maybe they were previously overly conservative, on the other hand, maybe they made significant recovery from the ILW market.

Risk Swaps

As new investors in the reinsurance market began to acquire 2006 commitments it was apparent that much of it was concentrated in the US. How to balance the book so that one is not totally exposed? One way to do this is to swap some of that risk for others. In particular, to swap US risk for some Asian risk. While no specific numbers are available, anecdote has it that there has been a big pick up in swap activity. As further testimony to the emergence of the risk swap market Swiss Re has begun a quote sheet for swaps in addition to its better known ILS price sheet.

ILS – Insurance-Linked Securities

From our point of view perhaps the biggest story resulting from Katrina is the growth in the ILS (a.k.a. Cat bond) market. The story is best captured in the figure below. We measure Cat bond issuance end first quarter to end first quarter. Between April 2004 and March 2005, $1.8 billion of bonds were issued. In the first 9 months of our recording period, April 2004 to December 2005, the total issue is $3.2 billion. To be sure, not all the growth has been in natural catastrophe bonds but then part of the ILS story is its expansion to different perils. More significantly, perhaps, is that almost two-thirds ($2.1 billion) of the issuance has been post-Katrina. One of the Sword of Damocles questions hanging over the ILS market has been “What happens when there is a loss?” We now know. The market absorbed the loss, re-priced and went forward. In fact, the first ILS was issued (by PXRE) within three weeks of Katrina making landfall.

Anecdote has it that the PXRe bond was stimulated almost entirely by Katrina, whereas the Aiolis bond of Munich Re was in planning

<table>
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<tr>
<th>Second Event Covers - No Reinstatement</th>
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<tr>
<td>% Change - End 2005 to End 2004</td>
</tr>
<tr>
<td>Trigger Point</td>
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<tr>
<td>$5 Billion</td>
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<td>$10 Billion</td>
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<table>
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<tr>
<th>Year over Year % Changes in Premium end 2005 vs. end 2004</th>
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<tr>
<td>Premium Strike</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>$5.0</td>
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<tr>
<td>$10.0</td>
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<tr>
<td>$12.5</td>
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<tr>
<td>$15.0</td>
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<tr>
<td>$40.0</td>
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<tr>
<td>$50.0</td>
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<tr>
<td>Average</td>
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prior to Katrina. That may have been reflected in the price ambitions of the issuers. PXRe’s Atlantic and Western bond was arguably 30% higher in premium than it would have been pre-Katrina. Aiolis, on the other hand, was infected by pre-Katrina price thinking and suffered as a result. In the end, an initially intended larger size issue was closed for only $130 million. Markets react; the ILS market is no different. And at years end PXRe did it again with a second issue, Atlantic and Western II.

The purpose of this paper is not to detail the current issues - we will do so in our review paper - nor is it to focus on why particular bonds reacted the way they did, we will do that in a follow-up piece, Why Good Bonds Go Bad. However, it is worth focusing on the price behavior of KAMP Re and a few others.

Issued in July 2005 at a price of 100, KAMP Re is now quoted at a price of approximately 2. Immediately after Katrina hit, KAMP Re dropped in price to 90 and traded there. Over the next three weeks, as people began to assess the concentration of exposure in KAMP, lots of commercial exposure in the Gulf, and the threat of Rita, the bond traded down to 70 and then 50. Another two weeks saw the price collapse to 4 or 5. The 4 or 5 represented the value of accrued interest to be received even if the loss was a total loss of principal. One feature that caused investors pause before trading down to zero was the specification of the reinsurance inuring to the benefit of the bond. This was not well detailed in the PPM and it took a company statement to convince traders that the loss would be total, notwithstanding reinsurance recoverables. No doubt investors will require greater specificity in future PPM’s. Incidentally, it may help to view trades below par on an impaired bond as the capital market equivalent of “dead cat” trading in the ILW market.

One other feature of KAMP Re that is worth noting is the reaction of the rating agencies. For a long time after the bond declined in price, the ratings were kept the same. What then do cat bond ratings mean. Are they rated for their credit worthiness or their inherent insurance risk? Only the former can justify not moving a rating in these circumstances.
Interestingly, in the early part of 2006 there is a price split among the broker dealers we monitor. One price represents the accrued interest at low levels until the bond matures; others have the price higher by a couple of points. We are not sure if this is due to inertia in pricing or if some feel that at $1 or $2 the bond represents a cheap option on the fact that the loss will not be total. Given the ambiguities, either is possible.

What KAMP Re’s experience has demonstrated is that there is considerable uncertainty associated with indemnity bonds which can tie up capital unnecessarily. The Arbor 1 deal which is modeled loss, or index-based, did not suffer a loss. However, even if it had, the extent of loss would have been known immediately, and investors could have moved on.

Other bonds suffering some ambiguity of loss are the Residential Re bonds and the Avalon deal. The degree of ambiguity is reflected in their prices - see graph. Several Residential Re bonds are outstanding and all are to some extent affected in price. The lowest prices of junior tranches trade in the mid-90’s. The price assessment is based on at least two things – the increased cost of risk capital and the probability that USAA’s actual losses will impair the bond. USAA has helped investors make the latter assessment by publishing a range of losses, some of which would begin to attach the bonds.

Avalon Re, a 2005 new issue that covered third party liability claims for the energy market has also suffered depreciation. There will be pollution claims arising from Katrina. Under the bond terms $150 million of claims could arise from a single event and the market is assuming this loss. The issuer again helped investors with the assessment by publishing registered claims on its web site. The market has assumed that through the Katrina claim half the deductible will be eroded, so a price around 80 was recorded.

Later, outside of the Gulf an explosion happened at an oil plant at Buncefield in the UK; this caused further price decline to around 75. That price has recovered a bit – see graph. It is worth noting that even if both losses are at maximum, there has still been no loss of principal to the bond. The deductible has eroded and the
bond has two years left to run. The price decline raises yields and reflects the fact that there is no retention left. Notwithstanding, the bond holders may yet end up loss free.

**ILS Premium Increase**

It may be obvious that different ILS have different stories associated with them, so generalizing about their premium increases is treacherous. Nevertheless, there are two observations that we can make. First, to the extent that the cost of risk capital has gone up, all outstanding ILS should have been marked down in price. This is analogous to all bonds going down when the Federal Reserve raises interest rates. The second observation is that we can only get an insight into the exact price shift if we have a constant expected loss curve. As we have seen, some bonds with eroding deductibles and the like will shift expected loss, so their price changes are not exclusively a cost of risk capital shift.

There is one bond, however, that is issued sequentially with a constant expected loss, and that is Arbor I. Its price progression is shown in the chart on page 10. Clearly, as premiums dropped through 2005, that trend was sharply reversed in the first post Katrina issue. The jump in premium of 23% is perhaps the best contemporary estimate of additional cost of risk capital. Increases in ILW prices of 35% probably combine the capital shift with shifting perceptions of expected loss.

**The Retro Market (Sidecars, ILS and capped QS)**

As we indicated earlier, the most sensitive market when there is a large industry loss is the retrocessional market. All large events correlate into the retro market and large losses can result. Any doubt is eliminated by looking at the losses of PXRe and Montpelier who both claim expertise in retros. They have both had to scramble massively (and successfully) to recapitalize. But they have also scrambled because they think it worthwhile. Premium swings are biggest in the retro market. High risk demands high reward.
In looking at the ways retro companies have sought to recapitalize, it is interesting to note several trends. First, they have used the traditional equity markets and the trust preferred market for pure capital capacity. Second, they have used the ILS market to shed peak exposures – see Atlantic and Western, and Champlain. Third they have used various quota share type arrangements to expand underwriting capacity and to produce fee income for their expertise. Earlier quota share arrangements in previous cycles were Hannover’s Kaith Re and Rennaissance Re’s DaVinci Re. This time round we have, for example, Blue Ocean and Flatiron plus many other unnamed partners. Sidecar arrangements are generally versions of capped quota shares.

One interesting question about the retro market is how big is it? Estimates vary from $6 to $12 billion in exposure. Not big numerically, but very important functionally. Without retro cover smaller reinsurance lines would be written. Without reinsurance fewer insurance lines can be written. The market is clearly composed of several types of cover: ILW’s for $2-$4 billion, traditional $4-6 billion, ILS $2-4 billion and now Sidecars $2-3 billion. What is remarkable is that over half of outstanding ILS were issued by reinsurance companies and now constitute a large fraction of the retro market. Indeed, ILS and ILW’s may account for one half to two thirds of the market.

Concluding Remarks

The forgoing is the story so far. No doubt other shoes have to drop. Nevertheless, it now seems safe to say that Katrina is that event that will be transformative in nature in the way business will be done going forward. The development of the ILS market has oft been predicted, but now it seems safe to call it a reality. For a final reality check, consider the graph above detailing the growth of issuance of ILS this year compared to previous. Looks like a trend jump to us. If that is true then the challenge will be to keep up with it as its various forms grow and strengthen. Stay tuned.

1 Benfield’s Bermuda Quarterly – 9M 2005 Capital Carousel, December 2005
4 Fitch Ratings New Thinking on Catastrophic Risk and Capital Requirements November 9, 2005
5 A fuller description may be found in Chapter 4 “Alternative Risk Strategies”, Morton Lane, ed., Risk Books 2002
6 See Lane, Chapter 5, op cit.