

US CMBS: IS PML THE ANSWER TO THE HURRICANE INSURANCE CRUNCH?

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SUMMARY

With the 2006 hurricane season already two-thirds gone, and its climatological peak of September 10th weeks past, no hurricanes thus far have reached American shores. Yet U.S. commercial real estate lenders and borrowers in the last few months are confronting a new insurance crunch: this time, for properties in states up and down the Eastern seaboard and the Gulf Coast, windstorm insurance is hard to obtain and its premiums can be unusually taxing. The reasons for this sudden spike in price and dip in supply are complex, but can be traced to fluctuations in the Atlantic climate, the changes that scientists consequently have made to models that reflect that meteorological reality, and then to the resulting business behavior of the insurance and reinsurance companies that base their pricing and supply on these models. This suggests that the insurance difficulties CRE lenders are finding today may not be merely temporary, and that underwriting assumptions for insurance premiums and the confidence of obtaining windstorm insurance easily may need to be fine-tuned.

Because Moody's expects properties to be insured to full replacement value, movement away from such full coverage could have credit and subordination level implications. Such adjustments to subordination levels, ranging from little or none to significant, will vary depending on many factors, such as the size and diversity of the pool and the characteristics of the individual loans. While some creative - and limited - alternatives to insurance may be introduced, they should meet the usual capital market standards. Loan document language relating to windstorm insurance should remain as firm going forward as it has been traditionally; introduction of "commercial availability" standards or their ilk into new loan agreements may have rating repercussions. Servicers, however, should be given greater flexibility at the pool level to examine each loan and its needs in context, and make modifications as necessary and proper, subject to the servicing standard.



Within the last few months, a groundswell of interest has arisen in the possible application of "probable maximum loss" (PML) approaches to addressing the windstorm insurance needs for individual properties. Moody's believes that with proper nurturance, PMLs may grow to be a powerful and useful tool, and may even have a circumscribed role presently, in triangulating insurance issues relating to individual properties, but they are not a panacea for this year's windstorm insurance crunch. Because of the factors detailed in this report, Moody's believes that at this point the commercial real estate finance industry should proceed prudently before time-tested underwriting standards are altered or abandoned

THE SITUATION PRE-KATRINA

Before the extraordinary hurricane season of 2004, when for the first time since 1886 five hurricanes hit the shores of the United States, windstorm insurance generally was available and affordable. Though there were exceptions in certain areas of the Gulf Coast and the Southeast¹, particularly Florida and coastal areas, these were the kind of mild exceptions that proved the rule. Hurricane Andrew in 1992 caused great damage but also had triggered the toughening of building codes and the creation of state-backed windstorm insurance programs in Florida and some Gulf Coast states. These two developments, along with a mostly competitive (i.e., a "soft") insurance market, permitted purchasers of windstorm insurance to operate on auto-pilot.

Insurance policies for properties not located in areas prone to windstorm damage usually said nothing in particular about windstorms; standard coverage was provided with little or no deviation. Properties located in hurricane-sensitive areas had the windstorm risk specifically carved out; but not to worry; windstorm coverage endorsements were readily available, at a cost, subject to somewhat larger deductibles than for other risks. Though properties closer to the coast, built with wood-frames, or of older design or vintage, may have had higher premiums and/or deductibles (typically 2% or 3%) than, say, a new inland property built of brick to post-Hurricane Andrew building codes, and while owners may have griped a bit about the price of the endorsements, the windstorm market was in relatively benign balance.

Then came the hurricane season of 2004. Instead of the historic average of 1.8 hurricanes hitting the US shores, five storms collided with the coast. The total insured damage was \$24 billion. Insurance companies were stressed, both by the number of claims and by the temporary lack of personnel to handle these claims, but prudent underwriting, decent market performance, and the adoption of hurricane modeling following Hurricane Andrew had prepared them financially for even this rare confluence of events.

The Saffir-Simpson Scale for Classifying Hurricanes		
Category	Winds	Effects
One	74-95 mph	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal road flooding and minor pier damage
Two	96-110 mph	Some roofing material, door, and window damage to buildings. Considerable damage to vegetation, mobile homes, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of center. Small craft in unprotected anchorages break moorings.
Three	111-130 mph	Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain continuously lower than 5 feet ASL (above sea level) may be flooded inland 8 miles or more.
Four	131-155 mph	More extensive curtainwall failures with some complete roof structural failure on small residences. Major erosion of beach. Major damage to lower floors of structures near the shore. Terrain continuously lower than 10 feet ASL may be flooded requiring massive evacuation of residential areas inland as far as 6 miles.
Five	greater than 155 mph	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Major damage to lower floors of all structures located less than 15 feet ASL and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5 to 10 miles of the shoreline may be required.

¹ 7.9% of real property value in the US is located in the coastal counties of the Gulf Coast and the Eastern seaboard up to and including Virginia according to AIR Worldwide.

Competition remained robust among insurers in Florida and elsewhere. Premiums rose materially for properties that were actually damaged, but only modestly for those left unscathed, and even less or not at all for properties in areas not directly affected. Some upward pressure was put on deductibles, but they generally remained in the 2% to 3% range. State regulators were on guard to stem precipitous increases in rates for personal lines. Because of the breadth of the damage, the adjustment process was slow-going, but eventually things got sorted out. In a prelude to Katrina-related issues, disputes broke out between insureds and insurers over wind-driven vs. storm surge (flooding) damage. All-in-all, however, most industry observers did not believe that U.S. commercial real estate generally would be ill-prepared or underinsured for the next year's hurricane season.

The 2005 hurricane season followed with a record 26 named storms² (the long-term average is 8.5 named storms, 5.2 of which become hurricanes; of those, 1.8 hurricanes per year on average hit US shores). Hurricanes Dennis, Katrina, Rita, and Wilma reached American shores and caused unprecedented, tragic losses in New Orleans and the Gulf Coast; insured damage totaled over \$58 billion. Still, the insurance industry as a whole was financially strong and able to withstand the punch to its surplus and reserves. The insurance industry reported after-tax statutory net income of \$43 billion in 2005, an increase of 8.5% over the 2004 figure of \$39.6 billion.

The National Oceanic and Atmospheric Administration's (NOAA) most recent prediction³ - which was reduced from the beginning of the 2006 hurricane season - was that 12 to 15 named storms were to form, with seven to nine becoming hurricanes and three to four of those becoming major storms (i.e., Category 3 to Category 5 on the Safir-Simpson Index). So far, with two-thirds of the hurricane season over, nine named storms have formed to date, with five becoming hurricanes; none have hit the US shores. According to the NOAA, "September has as many major hurricane landfalls as October and November combined."

Top 10 Hurricanes and Estimated Insured Loss		
(adjusted to 2005 \$\$)		
Year	Event	Insured Loss
2005	Katrina	\$40.6 billion
1992	Andrew	\$21.6 billion
2005	Wilma	\$10.3 billion
2004	Charley	\$7.7 billion
2004	Ivan	\$7.4 billion
1989	Hugo	\$6.6 billion
2005	Rita	\$5.0 billion
2004	Frances	\$4.8 billion
2004	Jeanne	\$3.8 billion
1998	Georges	\$3.5 billion

Source: Insurance Services Office

THE CURRENT CRUNCH

Thirty days after the new 2006 hurricane season rolled over on June 1st, so did many reinsurance treaties of commercial real estate property insurers. The windstorm insurance market began contracting slightly after January 1st (30 days after the official end of the 2005 hurricane season), accelerated its narrowing after April 1st, and reached sclerotic constriction after July 1, dates that are the traditional quarterly renewal anniversary for primary carriers' reinsurance treaties. Why did that happen?

Leading catastrophic modeling firms supplying the hurricane-loss models that help guide reinsurance companies' pricing and capacity decisions increased their aggregate US expected loss figures for insured windstorm losses significantly by assuming a greater frequency of hurricanes hitting the US shores, and by increasing and refining the input factors used to calculate the severity of storms that hit. These key assumptions rippled through the insurance industry. Reinsurance companies - the "wholesaler" backstops of the "retail" level primary insurance carriers from whom CRE borrowers obtain their property insurance - were forced to raise their reinsurance rates, and/or cut back on the amount of reinsurance they could offer. This in turn - when combined with the losses carriers experienced with Hurricane Katrina last year - compelled primary carriers to cut back on

² There was another storm, Epsilon, that formed just after hurricane season ended on November 30.

³ as of August 8, 2006.

what coverage they could or would offer insureds. These factors also induced primary carriers to charge high prices for properties in Tier 1 windstorm areas (those markets considered at greatest risk of hurricane damage).

2006 so far has been a somewhat "soft" insurance market in non-catastrophe-prone areas. Reportedly premiums for all commercial property lines are up just 2% from the same period last year, after having declined 7% from the same period the year before.⁴ Brokers for property owners in Indiana, for instance, have a relatively easy time selecting insurance programs and carriers (notwithstanding tornado threat). But the Southeast and the Gulf Coast are on the other side of this market dichotomy: for catastrophic coverage, it is a "hard" market indeed. Prior to Katrina, total industry windstorm insurance capacity was \$2 trillion; as of July 2006, existing windstorm insurance capacity was down by nearly 50% to about \$1 trillion⁵. Carriers writing large risks pulled out, severely reduced writings, or imposed low sublimits on windstorm coverage.⁶

In Tier 1 areas, almost across the board, it is not possible to replicate in scope and price the same coverage from 2005. Costs have increased along a spectrum starting at 40% to 50% on the low end, ranging up to 400% or more on the high end. Deductibles for windstorm are at least 5% of TIV (total insured value), if not frequently 7% to even 10%. Whereas it was possible, though expensive, to "buy down" the deductible, now it is well-nigh impossible. Particularly hard-hit, according to a leading CRE mortgage servicer, are five counties in Florida (Miami-Dade, Broward, Hillsborough, Pinellas and Palm Beach) and Houston, TX.⁷

This dichotomized market is actually highly fractionalized. Whereas owners of only one or two properties have an uphill battle obtaining windstorm coverage, blanket policies that cover anywhere from a handful of properties to hundreds of locations make it easier to obtain windstorm coverage, because the risk can be spread out among a pool: the benefits of diversity. Those who seek renewals are better situated than those entering the market anew. Owners of properties that are older or are not constructed to post-Andrew building standards are being pressured much more than those who own newer or better constructed buildings. Particularly handicapped are those properties that had damage in the 2004 or 2005 hurricane seasons. As one gets closer to the coast, premiums go up and availability of coverage goes down - especially for properties within a few thousand feet of the ocean.

The sharp increase in premiums has put mild to severe stress on the cash flow of many properties. The level of stress runs the gamut, depending on where that property places on the multivariate grid that affects premium pricing (vintage, distance from the coast, renewal, whether part of a portfolio, etc.) and how highly leveraged the property's owner is. Servicers have reported some borrowers coming in for relief, in the form of insurance waivers or for financing of premiums (which typically have to be paid in a lump sum), but they have not reported a massive overflow of pleas for lender mercy - at least not yet, because policy renewals roll through the year, and the crunch only started in earnest in April. Indeed, there have been some tentative reports that in the last month or so, the market has begun to improve *somewhat*, with increased reinsurance capacity. A big test will come in January, when a significant number of reinsurance treaties expire and are up for renegotiation.

Some have speculated that the so far unexpectedly mild 2006 hurricane season, if it continues, may help and open up capacity and modulate prices next year. Insurance availability and pricing run in high and wide amplitude cycles: capacity shrinks and prices rise, eventually prompting additional capital to enter the insurance market, allowing additional capacity to form and prices to then gradually descend. But because many experts believe that a secular change in the frequency and severity of hurricanes has arrived - an effect of a multi-decade cycle of fluctuations in tropical sea surface temperature⁸ - and because the underlying assumptions of catastrophe models that now govern how reinsurance and primary carrier companies price their product - and yes, also contribute to how rating agencies rate these companies - have been substantially modified, we believe the recent shift in pricing and capacity for windstorm coverage will not be a one-year wonder. Underwriting assumptions for insurance premiums of Tier 1 area properties therefore may need to be permanently upwardly

4 According to Marketscout.com; August 2004, August 2005 and August 2006 figures.

5 *Natural Disaster Catastrophic Insurance White Paper*, Mortgage Bankers Association, September 2006

6 The insurer of last resort in Florida - Citizens Property Insurance Company - has limits to what it can offer. It offers coverage that tops-out at \$1 million, does not offer replacement cost coverage, does not provide business interruption insurance, may come with some built-in co-insurance issues, and does not offer so-called (but very important) "ordinance and law" coverage. In early September, Florida began setting up a new commercial property insurance pool, where the limits will be \$1 million for property damage, and \$1 million for contents and business interruption insurance. Details are being worked out as we go to press.

7 According to the National Weather Service, 40% of all US hurricanes hit Florida, and 80% of all Category 4 or higher hurricanes that strike the US shores have struck either Florida or Texas.

8 The so-called "Atlantic Multidecadal Oscillation." The latest upswing began in 1995. Many experts believe the cycle will continue supplying hurricanes at above-average levels for the next decade or two.

adjusted. More importantly, the expectations of yesteryear, of insurance covering the risks we expect to be covered fully, may not return for a while.

MOODY'S TREATMENT OF LOANS WITH INADEQUATE WINDSTORM INSURANCE

Commercial real estate is a tangible asset that generates cash flow and has residual value. If this tangible asset is damaged, both its ability to generate funds and its residual value are impaired. Property insurance substitutes for that asset's ability to generate cash flow and supplies the money either to rebuild that asset or to pay down debt encumbering the property. Moody's expects assets to be insured to the full replacement cost - and for large loans and single asset deals, to have rent insurance for an "extended indemnity period.". Movement away from such full coverage could have credit and subordination level implications.

Loan Level Issues

Loan originators are coming under intense pressure from borrowers owning properties in the Southeast and Gulf States to be "flexible" and to re-choreograph the borrower-lender tango seamlessly performed in loan negotiations for decades. Insurance topics rarely came up as major negotiation issues before 2001; they were relegated to the esoterica that experts handled in the background. Now front and center for a wide swath of properties, borrowers and lenders must weigh the risks to each and to the other in advocating a position. In contrast to the terrorism insurance difficulties post-9/11 and pre-TRIA, borrowers are reacting a bit differently to the windstorm insurance crunch: while after 9/11, they may not typically have seen their property as a possible terrorist target and therefore sometimes vehemently resisted the lender's entreaties for proper terrorism insurance coverage, borrowers cannot deny the possibility of windstorm damage if they are in hurricane alley. Both the lender and the borrower agree windstorm insurance is needed and they both want to protect their investments. The question to be solved jointly then is, "How much insurance is needed, and how much is reasonable to spend?"

For portions of particularly large deductibles, or small slices of upper layers of insurance, stable, deep-pocketed sponsors of borrowers may choose to self-insure the gap between what insurance is obtainable and what is unobtainable, or what is obtainable at reasonable rates and what is obtainable at rates perceived to be unreasonable. But self-insurance does not mean *no* insurance. Self-insurance is a term of art. To Moody's, it means (i) a structured program in place (perhaps - in the most sophisticated form - with a "captive" domiciled in, for instance, Vermont); (ii) segregated funds, not commingled with other sponsor funds, with an identified administrator; (iii) actuarially determined reserves/surplus⁹; and (iv) a pre-defined claims/payment procedure.

Others may seek to fill the gap by offering letters of credit (LOCs), or by increasing reserve funds. These are acceptable methods, provided the usual capital markets standards for LOCs and reserve funds are honored.¹⁰

Venturing away from these solid, lender-friendly solutions into more borrower-friendly (and more risk-friendly) approaches, is loan document language that bears striking resemblance to that developed in post-9/11- pre-TRIA loans, or mirrors that of the earthquake insurance arena: injecting "commercial reasonableness" or "commercial availability" standards into the loan document brew. (The most risk-friendly approach is putting a pre-determined cap on a windstorm insurance endorsement premium, or worse, putting a cap on the *entire* property insurance package premium.¹¹ These slippery-slope arrangements carry a significant menace to credit-neutrality.) Commercial-reasonableness and commercial availability standards grafted-on from difficult earthquake markets carry other, but no less dangerous risks for the lender and the CMBS investor. If the market is difficult - i.e., things get "commercially unreasonable", the borrower will be let off the hook for insurance, and the lender is left carrying a risk that normally is the insurer's -- who declined to take that risk because it was too great or was priced too dearly.

9 This actuarial determination may be the Achilles heel of self-insurance: debate over proper methodologies, and therefore the correct amount of reserves/surplus, could be a difficult process. Note that Moody's expects that insurance providers for large loans carry a Moody's insurance financial strength rating of at least **A3**. This is why, from a practical viewpoint, self-insurance should be limited to things like deductibles and small slices of coverage.

10 Financing of premiums, that is, the payment over time of premiums that are normally paid in one lump sum, is also a possible relief valve, if handled properly (e.g., always absolutely requiring the finance company to give prior written notice and sufficient time to the servicer to cure before canceling a policy). Insurance premium financing should only be used as a post-closing fix for distressed borrowers; loan originators confronted with large premiums should structure reserve/escrow accounts, with appropriate loan funding holdbacks, to solve insurance premium problems identified at origination.

11 See "[U.S. CMBS: Insurance Premium Caps May Have Negative Credit Implications for Large Loan](#)", Moody's Special Report, June 2005

Any such approach necessarily lessens the protection that lenders assume they have when they give money in exchange for a mortgage on tangible collateral: the certitude that an insurance policy will always substitute for real estate if destroyed. Lenders should not be forced anew to calculate the probability that in a hard insurance market, its property insurance will take a quantum leap and dissolve into a shadow of its former self. It may be best to insist on what lenders have always insisted on: get proper insurance, or pay off the loan. If the loan documents do not give the borrower that stark choice for windstorm insurance on a property located in hurricane alley, then the risk of that lender going insurance-bare will have to be factored in to the rating of that loan at origination.

Originators also need to closely examine blanket policies to determined asset concentration in hurricane-prone areas. Sometimes the maximum coverage under blankets is not equal to the TIV of all the properties covered but is a reasonable portion of it. However, if there is a high concentration of collateral within a hurricane zone, because damage from one named storm to many properties would be deemed a single "occurrence," there could be a chance of blowing through the coverage ceiling. Therefore, as part of due diligence (and proper disclosure to rating agencies and investors), lenders should get a schedule with agreed values of all properties covered under blankets, detailing how many are within a certain radius of the others and how many are in Tier 1 hurricane zones

Pool Level and Servicer Issues

Diminished windstorm insurance coverage in a fairly homogenous conduit pool, without an undue concentration of assets in Tier 1 hurricane areas (i.e not more than a small percentage of loans with modestly inadequate coverage, and no large individual loans with more than modest coverage problems) should have little or no credit impact. Chunkier pools, with one or more large loans with windstorm insurance issues or a concentration of smaller loans in Tier 1 areas with windstorm issues, would be subject to greater stress and therefore demand greater adjustment to subordination levels. The adjustment would be of larger magnitude at the **Aaa** level, tapering slowly down the capital stack. The velocity of narrowing would depend on a multiplicity of factors, importantly among them, the size of the pool vs. the number and size of the affected loans, the leverage of the subject loans, the mitigants supplied (for instance, LOCs, reserves, insurance gap guarantees from rated sponsors)¹², the modesty or severity of the windstorm insurance issues for each affected loan, and the geographic concentration of the pool assets (too many loans focused on coastal Florida, for example).

Servicers again will be confronting the thankless but essential task of enforcing loan document language and pooling and servicing agreement (PSA) requirements. Lessons learned from the last insurance capacity-and-pricing crisis involving terrorism insurance will prove helpful, even though the risks and concerns posed are qualitatively and quantitatively different. Servicers were faced then with often defiant borrowers, and with inflexible loan and PSA documents. Expensive, drawn-out legal battles ensued in which servicers repeatedly succeeded in getting terrorism coverage but that sometimes resulted in interest shortfalls to investment grade tranches. With windstorm insurance, borrowers will likely be somewhat less defiant and more compliant, because the risk is actuarially undeniable. But there will be disputes and tough decisions to make.

However, now PSAs give the master and special servicer more leeway than previously. Moody's believes that servicer flexibility is a good thing, when structured the right way. No longer do all loans without completely conforming insurance have to be transferred into special servicing (with the consequent incurrence of a special servicing fee). Language that once focused exclusively on giving flexibility to the servicer vis-à-vis terrorism is morphing (with Moody's blessing) into language that gives a bit more give for windstorm insurance problems - and sometimes for other difficult-to-insure risks. Master servicer consultation with the special servicer and the controlling class representative (CCR) is required, and measured dispensation can be granted when the special servicer and/or the CCR agree - subject to a "servicing standard" override.

The standard for what many PSAs call an "acceptable insurance default" that triggers the servicer's right to reassign is phrased this way: *"the borrower's failure to obtain insurance, if the Servicer has determined that such insurance is not available at commercially reasonable rates and the subject hazards are not commonly insured against at the time by prudent lenders for real properties similar to the Mortgaged Property and located in and around the region in which the subject Mortgaged Property is located."* This gives the servicer a principle to apply that not only considers the cost of the insurance, but whether prudent lenders have abandoned all hope

12 Care should be taken that any such guarantees not adversely affect nonconsolidation opinions.

of requiring borrowers to obtain such insurance, *notwithstanding the cost*. So if the necessary insurance is very expensive, but still prudent lenders are demanding it, the borrower gets no hall pass. We do not believe, however, that this flexible standard should be memorialized in the loan documents themselves, as this would give an entrée to the borrower to sue the lender for not compromising. It is better to leave all the flexibility among parties on the debt side of the equation.

This more elastic approach could help lessen the frequency and severity of nasty litigation that plagued many pools with terrorism insurance issues. At least from Moody's perspective, servicers need not have knee-jerk responses in demanding windstorm insurance in **all** cases; the rating adjustment will vary from very low to nothing in some cases, to higher in others. Of course, the servicer will need to consider the scope of its possible liability to bondholders if it does not demand windstorm insurance, a hurricane hits and causes a loss, and the inevitable second guessing starts.

PROBABLE MAXIMUM LOSS APPROACH: FOR INDIVIDUAL PROPERTIES, NOT YET READY FOR PRIME TIME

Real estate owners and lenders agree that no property need be over-insured: too much insurance is too much of a good thing. The thorny debate, of course, is exactly how much *is* too much of a good -- and nowadays, a very expensive -- thing. With windstorm insurance recently becoming harder to find and harder to afford, pressure has been mounting in some quarters to introduce the "probable maximum loss" (PML) approach to help size the proper amount of windstorm insurance.

PMLs have been around for many years. They originated with insurance companies' needs to roughly calculate the reasonable upper bound of possible fire damage to a building assuming all proper fire safety and suppression systems were working.¹³ The phrase and the approach then migrated into earthquake damage analysis, where it grew more sophisticated and blossomed into an important cottage industry supporting building design, engineering, and financing. PMLs, applied on a broad portfolio basis, also are used by insurance regulators, reinsurance and primary insurance companies, and rating agencies to gauge the adequacy of insurance companies' surplus and reserves against the shock of catastrophic losses for which they write insurance coverage. Armed with knowledge of their known limitations, and with a rough and ready adjustment to their output because of their inherently unknown limitations, PMLs many times, and in the right contexts, can be useful tools.

Within the last few months a nascent, grass-roots movement has been raising questions about whether adoption of a "PML approach" for mitigation of hurricane insurance requirements is a prudent possibility. The argument is that acceptance of PMLs for hurricane insurance needs (i.e., having a building insured up to the calculated PML instead of the more expansive and expensive traditional alternative, full replacement value) will open up windstorm insurance capacity by reducing demand, will lessen the cash flow burden on already thin DSCRs, and will cut down on loan defaults for failure to comply with loan document insurance criteria.

Moody's believes that at this point, with the large number of uncertainties, ambiguities and unresolved issues relating to windstorm PMLs, the real estate finance industry should proceed gingerly, step by step, as methodologies are fine-tuned, empirical data are gathered, definitions become consistent and standardized, and the whole package is then accepted by consensus of industry stakeholders, before time-tested, prudent underwriting practices for windstorm insurance are abandoned.¹⁴ Windstorm PMLs *for individual properties* may very well have an important role in the near future, and may even have a circumscribed role presently, but they are not the panacea for this year's windstorm insurance crunch.

Moody's has been presented with a number of PML studies in the last few months, for large to very large properties located in hurricane prone areas. They varied in detail, comprehensiveness, and quality dramatically. Some were done with great care, but with arguable assumptions and methodologies. None was fully acceptable and was able to convince us to alter our expectation that the subject property could do without full- or nearly full - replacement cost windstorm insurance.

¹³ This is distinguished from maximum *foreseeable loss*, which estimates a worst case scenario of all systems failing.

¹⁴ Moody's does not believe that the earthquake insurance approach -- a handy though somewhat imperfect legacy that the real estate industry adopted, that the capital markets acquiesced in but that is currently undergoing an intensive industry-wide re-examination led by the Mortgage Bankers Association - is a fully analogous template that can be freely transplanted to solve the windstorm insurance crunch.

Some problems we have identified with the immediate acceptance of current generation of windstorm PML for individual properties are these:

- Most of the assumptions are based on limited data. Many years of effort, and many federal dollars, have gone into studying the science of earthquakes and its effects on buildings. There generally has not been an equal and corresponding amount of effort on effects of windstorm on buildings. Experts believe that data on historical events is relatively incomplete; few of the significant windstorms in the 20th century have reliable gust information. Generally, models do not incorporate a figure that tries to estimate the effect of lack of true understanding of how hurricanes work and the existing lack of a complete suite of data.
- As a leading catastrophe modeler has written: "It is universally accepted that the proliferation of PML definitions is confusing, and can lead to problems for insurance decision makers."¹⁵ "PML" is a phrase that includes so many variant approaches, assumptions, and omissions that the output presented to decision makers cannot just be plugged in to permit a certain value of insurance coverage.
- Only recently, for instance, Hurricane Katrina showed the severe limitations of the assumptions underlying storm surge damage calculations. What other areas of windstorm effects are being underestimated?
- The common use of a 475-year return period, inherited from earthquake PMLs, may not square with our Moody's rating grid, especially for single asset deals. For instance, the default rate expected of a **Aaa**-rated bond over 10 years is 0.01%. The 475-year return period therefore may not be a nearly demanding enough standard. As the above quoted catastrophe modeler also wrote "The use of 475 years as a return period ... is arbitrary; other long return periods might be chosen."¹⁶
- The convenient use of favorable assumptions or omissions of inconvenient data. Some have assumed that demand surge¹⁷, a figure that can range up to 40% in extreme cases, would be nothing or close to nothing. Some have assumed that storm surge will not occur. Some have used the "long-term" view, rather than perhaps the more relevant "short term" view.¹⁸

We believe that PML studies *for individual properties*, if they are to move into the realm of commercial real estate finance industry acceptance, will have to include certain facts, assumptions and other enhancements, such as:

- Using the short term view, in addition to the long term view of hurricane frequency and severity.
- Providing a range of scenarios, including using a menu of loss exceedance periods¹⁹ greater than 475 years that more closely match Moody's expected default stress levels for the upper reaches of investment grade.²⁰
- A statement of a realistic measurement of error for a single property study. This reflects the fact that PMLs, with all the primary and secondary uncertainties of the data and methodologies, are more accurate when used on large portfolios of properties than on individual properties.
- Inclusion of realistic "demand surge" calculations in the result.
- Use of at least two models' outputs to determine results for very large loans.
- Transparency and disclosure of key assumptions: a model is only as good as its assumptions.
- Focused, detailed analysis of the subject properties' design and construction, rather than generic, off-the-shelf analysis that only roughly considers the particulars of a building.
- Use of a highly reputable, highly expert consultant.

PML modeling for windstorm is still in its infancy. With proper nurturance, it may grow to be a powerful and useful tool. But until then, Moody's believes that unquestioning employment of property-level PML studies as a quick fix to the windstorm insurance crunch would trigger an imprudent transfer of risk to CRE finance investors.

15 Gordon Woo, "Natural Catastrophe Probable Maximum Loss" British Actuarial Journal, Volume 8, Part V (2002).

16 Ibid.

17 "Demand surge" is the sudden increase in prices for construction materials and labor that can follow the effects of a catastrophe, as numerous consumers in the affected area cause a greatly spiked demand for these things to reconstruct their properties.

18 The "long term" view is the suite of historical hurricane data compiled over the decades; the "short term" view is the set of extrapolated figures gleaned from the behavior of windstorms in the last few years: as discussed previously, higher figures.

19 A range of confidence levels, not just the mean (e.g., the 90% level), should also be provided.

20 As you get to the far reaches of an extended return period, the results become "fuzzier" and come with less confidence. Nonetheless, such figures will be useful as one more ingredient helping to size the risk.

Doc ID# SF83237

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