

# Index-linked Hedges

By Bruce B. Thomas

Discussions of how insurers and reinsurers can hedge catastrophe risk using index-linked securities often begin and end with the term “basis risk.” While unexpected variation in hedge performance is certainly a significant consideration in determining the best way to mitigate catastrophe loss, it should not be the only consideration. Indeed, basis risk has been a showstopper in the past primarily because no one had quantified it on a real index using actual insurance and loss experience. New research from IndexCo, LLC, the publisher of the Guy Carpenter Catastrophe Index, puts this issue in perspective and sets the stage for a review of some of the advantages of index-linked securities.

## Basis Risk

Unlike traditional reinsurance, index-linked contracts are not based on individual insurer loss experience. The more unexpected variation there is between an insurer’s loss experience and the index, the more inefficient an index-based hedge becomes, causing the insurer to either pay more for protection than is necessary or retain too much risk. Although the hedge has an equal opportunity of exceeding the insurer’s actual loss, the real issue is effectiveness; will the hedge perform as expected?

IndexCo’s Hurricane Fran research<sup>1</sup> provides good reason to believe that a hedge based on the Guy Carpenter Catastrophe Index can perform well enough to provide a viable alternative to reinsurance. This analysis indicates that homeowner insurer loss experience was very highly correlated with the Guy Carpenter Catastrophe Index, and most of the insurers in this study had correlation coefficients in the middle to high ninety percent range (Table 1).

**Table 1: Correlation of Company Losses to Hedge Recoveries<sup>2</sup>**

	ZIP Code		ZIP Code
Company	Hedge	Company	Hedge
A	99%	I	95%
B	98%	J	92%
C	97%	K	92%
D	97%	L	90%
E	97%	M	90%
F	96%	N	88%
G	96%	O	87%
H	95%	P	62%
		<b>Average</b>	<b>92%</b>

<sup>1</sup> This research can be found on-line at [www.indexco.com](http://www.indexco.com).

<sup>2</sup> A ZIP code hedge was determined by multiplying ZIP level Index values for Hurricane Fran in North Carolina times each company’s amount of insurance in-force within each ZIP code and summing the products. By random sampling with replacement each company’s ZIP level losses 346 times and summing the results, we created a new observation. This process was repeated 500 times for each company to generate correlation coefficients between individual company losses and the ZIP code hedge recovery.

Moreover, IndexCo found that hedge performance for Hurricane Fran improved dramatically as the number of a company's insured houses increased and as catastrophe damage increased. This is particularly important since it indicates that insurer loss experience will more closely track the Index in the areas where they have more insured houses and as event size increases. Thus, index-based contracts may well be a good complement to traditional reinsurance, providing alternative or supplemental coverage in highly exposed areas and for higher layers of risk.

While it is true that basis risk, however small, impairs risk transfer effectiveness, insurers and reinsurers need to weigh the cost of this uncertainty against the many advantages of index-based hedges.

### **Efficiency**

The standardization inherent in index-based contracts helps make these contracts much more efficient than UNL-based (ultimate net loss) contracts in several respects. Buyers and sellers can save time and resources by using the Index as a means of describing and evaluating catastrophe risk. Understanding all of the unique characteristics of a given insurer's book of exposures and loss potential requires a great deal of expertise and involves both parties in a process that is time-consuming and costly. With index-based contracts, negotiations can be expedited by focusing on price, credit, and settlement terms. Since the Index determines settlement values, reinsurers' burden of auditing and processing claims is substantially eliminated.

### **Confidential Information**

Index-based hedges also eliminate the insurer's need to disclose confidential information. With settlement based on an index, the insurer no longer needs to reveal its growth plans, distribution systems, underwriting practices and claim payment policies. Without the need to gather, disseminate, and discuss this information, the insurer has much more flexibility in managing its catastrophe risk on a real-time basis as the company's needs and market conditions change.

### **Marketability**

The inherent standardization of index-based contracts permits pricing to be more transparent and, therefore, more directly related to the underlying risk. With the ability to check market prices and execute transactions on a daily or weekly basis, an insurer can tailor its risk management strategy to best suit its current needs in light of changing market conditions.

Risk takers should also prefer index-based contracts since they place potential moral hazard and unfavorable changes in business plan or practice back in the hands of insurers, where they belong. With an index-based hedge, there is a tremendous incentive for insurers to perform better than the Index, since this enables them to effectively buy catastrophe coverage more cheaply.

Furthermore index-based contracts should be more attractive to investors, since they have greater potential for an “after-market” than traditional reinsurance. This is very similar to the premium that publicly traded securities command over similar non-public offerings. Ultimately, the standardization implicit in index-based contracts and the greater prospects of liquidity that these securities offer should translate into lower prices for hedgers who desire to cede risk in this format.

### **Credit Risk**

Traditional reinsurance is highly leveraged, and there is always the possibility that events will be so catastrophic that some reinsurers cannot make good on their obligations. Securitized reinsurance helps spread catastrophe risk beyond the traditional markets and gives hedgers greater access to capital. By having several sources that are ready, willing, and able to provide capital in the event of a catastrophe, hedgers can diversify and mitigate credit risk.

### **Legal Risk**

Hedgers who desire a capital market solution may find that index-based securities help mitigate the risk that settlement may be delayed or impaired due to litigation of one sort or another. Having a third party determine settlement value eliminates concerns about potential manipulation and eliminates the need for many of the representations that an insurer would otherwise be required to make in a security offering.

### **Conclusion**

IndexCo’s Hurricane Fran research demonstrates that a monoline, ZIP code-based catastrophe index can substantially eliminate basis risk from index-linked securities. Now that we have some statistics quantifying the extent of potential basis risk, it is time for insurers and reinsurers to reexamine how index-based contracts can help mitigate their catastrophe exposure. If it is as small as this latest research suggests, the inefficiency caused by basis risk may well be less than the inefficiency inherent in traditional reinsurance and UNL-based securitized instruments.

### ***Author’s Note:***

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