OTC weather derivatives

Despite impressive advances in technology, nobody can control the weather. We can predict the weather short-term, but cannot prevent it from happening. This frustrates many CFOs and shareholders of companies whose bottom line is impacted by weather. Since investors are looking for stable returns, weather derivatives were introduced more than a decade ago as risk management products to reduce financial risk associated with adverse or unseasonal weather conditions.

The weather derivative market is split into a traded market, contracts offered predominantly by the CME, and the OTC market. The traded market is primarily used by large energy companies for whom the mainstream Heating Degree Day weather index at large US or European cities during winter season matters. However weather risk comes in all forms and shapes and affects a very wide range of industries. Think of construction companies that cannot work during harsh winter periods and amusement parks counting losses when summer is particularly rainy. Many businesses either thrive or take a big blow based on what the weather does, from your local ice-cream truck to a music festival or a large hydropower plant. They all have very individual weather risks which cannot be covered with exchange traded contracts. They need customized solutions to mitigate the financial impact of adverse weather on their returns. Welcome to the world of OTC weather derivatives.

"The climate is what you expect; the weather is what you get." *Robert A. Heinlein*

I assume most readers are derivative experts but not very familiar with weather derivatives in particular. Weather derivatives are typically regular call and put options on an index. But rather than the index being a commodity or stock index, weather indices are based on underlyings such as rainfall or temperatures. Weather indices really are what make it special as they convert information we all hear on a daily basis in the weather forecast (blue sky with some clouds with temperatures ranging from 15–25 °C) into financial products. In order to customize a hedge for a company, one needs to establish a weather index as the independent variable as well as driver and proxy for cost or sales. There are two main types of indices: Critical Day Indices and Cumulative Indices.

Critical Day Indices set thresholds to define a critical day, for example, days with more than 10 mm rainfall, or daily minimum temperatures below –5 °C. Every day during the risk period counts either one or zero index points depending on the actual readings of the weather station for that day. The final index value is the sum of the critical days.

Cumulative Indices do not set thresholds but total the value of daily meteorological measurements during the risk period, for example, the sum of daily rainfall in mm, or the sum of daily average temperatures. The final index value is the total of the daily measurements.

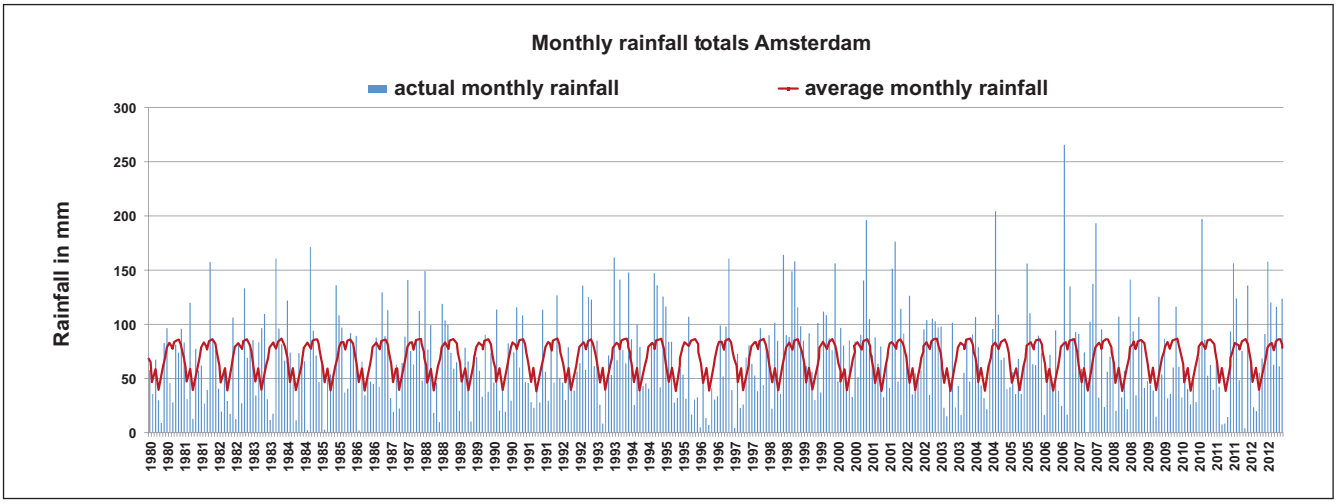
Inherent in all OTC transactions is the fact that all parameters are negotiated by the buyer and the seller. For weather derivatives they include: risk period, weather station (typically the national meteorological office), index definition, payout formula, payout per index point (tick size) and cap. Most weather options are capped as weather usually fluctuates in ranges. For example, it is unlikely that London sees daily temperatures in excess of 50 °C.

The OTC weather market is predominantly a hedgers' market where option buyers are weather dependent companies looking to reduce weather exposure and option sellers are reinsurance companies who are willing to take the risk. Before 2008 investment banks acted as risk takers but after the financial crises most of them reduced or stopped altogether activities in commodities and exotics such as weather. We now see hedge funds with insurance linked securities (ILS) strategies interested in the domain as weather offers uncorrelated returns.

Since the OTC weather derivative market is a hedgers' market, and weather typically is an insurance theme and not a financial markets underlying, the question arises about weather insurance.

The modern insurance business has its roots in the coffee houses of London back in the 1700s where explorers and entrepreneurs found risk takers. The traditional insurance is the one of a fate community where all community members pay in a pool and those who suffer a loss get compensated. Since then special insurance covers have evolved to include what is widely known as Alternative Risk Transfer (ART), agreed value type policies which are essentially derivative-like contracts. The most recent Weather Risk Management Association (WRMA) conference in September 2013 in London had a number of panel discussions focusing on the few distinctive features and the many common points of insurance and derivative weather hedging solutions.

As Jonathan Post from Swiss Re pointed out, key legal elements of insurance are the insurable interest and the proof of loss. In his view, the insurable interest is easily demonstrated for companies trying to hedge weather risk. Regarding the proof of loss, it is viable in an insurance contract to use a proxy to show a loss, as commonly used in agreed value policies. Therefore, index-based weather insurance can be and is marketed across large parts of the planet. In fact, there are probably more countries allowing weather covers as index insurance than as derivative. Especially in the agricultural industries in developing countries these policies are widely used and it would obviously be too costly to have a loss adjuster accessing actual damage of smallholder farmers.



Actual monthly rainfall at any given meteorological station can differ massively from the expected average rainfall, making the case for exposed businesses' hedging needs.

Competition of weather derivatives with weather index insurance in the European market place are still rare as most of the companies offering ART solutions have a carrier licensed to offer derivatives but not insurance. The insurance solutions have also the disadvantage of the insurance premium tax which can easily increase the final price for the buyer by 10% depending on the country. Since the 2007/08 financial crises, the reputation of derivatives has suffered badly and many CFOs of SME companies prefer an insurance solution or simply are not allowed to enter derivative transactions.

"Weather derivatives: melting point of insurance and financial markets."

In financial markets, derivative products started as hedging tools, but today speculation is making up most of the trading activity. Some of the financial bets got so big that they eventually threatened the system. As a result, boards do not even want to hear about exotic derivative strategies for hedging purposes. The insurance industry is slowly realizing the potential of weather index insurance and is in a good position to grow the weather index insurance substantially.

Index insurance is also used in the reinsurance industry. Widely known as parametric reinsurance, this type of ART is mostly used in "Nat Cat" covers. Using parametric reinsurance transactions on natural perils such as windstorms or hurricanes are frequently found as the basis of CAT Bonds. Cat bonds and direct collateralized reinsurance transactions are growing markets for the alternative investment space. An increasing number of investors are appealed by attractive returns and an asset class with non-correlating returns. Reinsurance premiums get under pressure from capital markets as the inflow in the ILS space puts pressure on risk premiums. It seems as if the retail weather index market was shifting from its start as derivatives on a trade market to an insurance enjoying a wide distribution network of insurance companies and insurance brokers. What used to be a pure reinsurance market however is now gaining momentum for hedge funds.

As through climate change weather patterns are becoming increasingly volatile, demand for financial protection is rising. With climate change and its impacts on food and water security as well as energy price volatility being major strategic topics discussed by heads of states, financial products mitigating financial risk of this megatrend are gaining importance.

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Before founding CelsiusPro, Mark spent many years with a leading Investment bank and has in-depth experience in the area of FX Cash and Collateral Trading. In his last role as Director at UBS Investment Bank London, he was responsible for FX Prime Brokerage Sales, where he advised hedge funds and broker/dealer firms in risk management, processes and trading platforms.