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Weather Derivatives

A truly alternative asset class for investors.

It is estimated that one-seventh of the U.S. economy is affected by weather risk. Weather impacts are the most pronounced for energy and power firms. For instance, the consumption volume of natural gas depends heavily on how cold the winter season is. Weather derivatives are perfect instruments for hedging volume risk.

Since its inception in the fall of 1997, the over-the-counter weather derivatives market has been growing steadily. The global market size is currently estimated at US\$8 billion. In the fall of 1999, the Chicago Mercantile Exchange introduced temperature futures for a dozen cities in the United States. That same year, an Internet-based trading consortium, I-Wex, began in Europe. Virtually all of the market growth in this area occurred in the U.S., with Europe and Asia trailing far behind.

The contracted weather variables include temperature, precipitation, wind speed, and humidity. The vast majority of the contracts are temperature-based, which typically cover a season or a month. The contract variable is either heating degree days (HDDs) for the winter, or cooling degree days (CDDs) for the summer. HDDs (or CDDs) measure how many degrees the average daily temperature is below (or above) 65 degrees Fahrenheit. The colder the day, the higher the HDDs; the warmer the day, the higher the CDDs. The daily HDDs or CDDs are then accumulated for the contract period. To illustrate, suppose the daily average temperature in Fahrenheit for June 1st, 2nd, 3rd, 4th, ..., and 30th are 67, 69, 65, 68, ..., and 72, respectively. The daily CDDs would then be 2, 4, 0, 3, ..., and 7. The monthly CDDs for June would be the sum of 2, 4, 0, 3, ..., and 7. If it turns out to be 180, then, depending on what the contracted level of CDDs is, one party will pay the other according to the difference between the contract level and the realized level of CDDs.

Contracts have also been struck based on custom-tailored variables. For instance, in May 2000, Corney & Barrow, a wine bar chain in London, England,

entered into a temperature contract to hedge against low sales on cool summer days. The chain found that when the temperature is below 24°C, customer volume starts to dwindle. To hedge against unfavourable temperatures, Corney & Barrow purchased a derivative contract for the June - September season, which entails a payoff of £1,000 (24°C - T) per day for the days when the temperature (T) is below 24°C. Similar contracts have been used by restaurants.

As an alternative asset class, weather derivatives also hold their appeal. Given the relative youth of the instruments, very little is known about their true role and potential in general investments. But risk reduction or diversification ought to be the main focus. Our limited research shows that the correlation between stock market indices and local temperatures is, typically, very low. This suggests diversification potential in a portfolio's context. Indeed, in Europe, several hedge funds have been set up that are dedicated to weather derivatives.

The current state of the weather derivatives market is still typified by high bid-ask spreads and low liquidity. I-Wex has launched three temperature indices for Paris, Berlin and London, respectively. The London International Financial Futures Exchange (LIFFE) plans to launch futures contracts on these indices. With more such broadly based contracts being formally traded and increasing public awareness of this new breed of financial instrument, there is potential for broader participation in the market. This growing interest will eventually make weather derivatives a truly alternative class of investment assets. ■

