

The Legal Characterization of Weather Derivatives

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Weather derivatives are an emerging class of financial instrument, designed to provide protection against adverse changes in temperature, precipitation, and the wide range of weather risks to which businesses are subject. The phenomenon of weather risk can be illustrated by the example of a company that derives its revenue from the generation or sale of electricity. A cooler than usual summer or a warmer than usual winter will mean a lower demand for electricity, leading to a decline in the company's revenue and profits. Equally, lower than expected rainfall may adversely affect the quantity of electricity that the company's hydroelectric generators can produce. Weather derivatives can readily be crafted to deal with narrow or broad changes in a single climatic condition, or a combination of different climatic conditions. In the above example, the company could manage its weather risk and cover any decline in revenue by entering into a temperature derivative, under which the company would receive a predetermined payment from its counterparty in the event of an adverse change in the average temperature during a particular summer or winter (Dischel and Barriou [2002], p. 31). The company could similarly transact a precipitation derivative to hedge the risk of lower than expected rainfall.

Trading companies have traditionally sought to protect themselves against weather risk, either directly through the purchase of

property and casualty insurance policies covering the damage to corporate property caused by adverse climatic conditions, or indirectly through the use of commodity futures to protect the company against adverse weather-related fluctuations in the price of the commodities supplied or purchased by the company. Weather derivatives differ from these traditional risk mitigation instruments in two key respects. Insurance policies are, in general, designed to provide protection against the consequences of extreme climatic events and other natural disasters (such as earthquakes, hailstorms, and hurricanes), while weather derivatives are typically used to provide protection against more moderate climatic conditions (such as inclement weather). In addition, weather derivatives, unlike commodity futures and other common types of derivatives, provide protection against weather-related declines in the volume of demand for, or supply of, a commodity; that is *volumetric risk*, as opposed to price risk (Ali [2000a]).

The global market for weather derivatives continues to enjoy strong growth. It is estimated that weather derivatives with an aggregate notional value of USD4.2 billion were transacted in the 12-month period ending March 31, 2003 (PricewaterhouseCoopers [2003]). The development of this market has been greatly assisted by the creation of standard-form agreements for temperature and precipitation derivatives, by the Weather Risk Management Association (WRMA) and

the International Swaps and Derivatives Association (ISDA). Despite the legal certainty introduced by these standard-form agreements, there remains one critical area of legal risk for the parties to weather derivatives, that relating to the proper legal characterization of weather derivatives.

WEATHER DERIVATIVES AND INSURANCE PRODUCTS

The issue can be framed simply: "Are weather derivatives insurance products?" If they are, the party obligated to make a payment under the weather derivative on the occurrence of the stipulated climatic condition faces the risk that it will be considered to be carrying an insurance business, for which it requires governmental authorization. Failure to hold the requisite authorization poses a major problem. In many jurisdictions (including New York, England, and Australia), the carrying on of an insurance business without authorization is a criminal offense.¹ A court in those jurisdictions may also treat the weather derivative as being legally unenforceable. This issue of proper legal characterization is not, however, unique to weather derivatives. It is highly relevant to all risk-transfer arrangements, including credit derivatives and the risk-transfer instruments that underlie catastrophe-linked securities where one party voluntarily assumes credit, catastrophic, or other discrete risks and agrees to make a predetermined payment to its counterparty on the occurrence of a stipulated event (Ali and de Vries Robbe [2003], paras. [2.270]-[2.330] and [5.100]).

In the case of weather derivatives, the conventional analysis that weather derivatives were not insurance products was called into question by the release in September 2003 of a draft White Paper on weather derivatives by the National Association of Insurance Commissioners (NAIC). The NAIC controversially opined that (NAIC [2003], p. 8):

weather derivatives and other "non-insurance" products are primarily temperature protection coverages (heating and cooling degree days) that appear to be disguised as "non-insurance" products to avoid being classified and regulated as insurance products . . . This paper concludes that these weather financial instruments are and should be classified and regulated as insurance products for the benefit of the buying public.

Following submissions by the WRMA, ISDA, and others, the NAIC decided not to proceed with the formal publication of this paper (ISDA [2004]). Nonetheless, the furor caused by the NAIC draft White Paper shows the issue of the proper legal characterization of weather derivatives is deserving of closer attention.

LEGAL STRUCTURE OF WEATHER DERIVATIVES

The claim that weather derivatives are, in substance, insurance products is premised upon the generic contractual terms setting out the obligation to make a payment on the occurrence of a stipulated climatic condition being treated as equivalent to the payment obligations under an insurance product insuring against the same climatic condition. For this purpose, it is useful to examine the legal structure of, and payment obligations under, the most common type of weather derivative, the temperature derivative. Temperature swaps and options make up the vast majority (over 80%) of weather derivatives transacted (PricewaterhouseCoopers [2003]).

The payment obligations under a temperature derivative are, in general, based on either Heating Degree Days (HDDs) or Cooling Degree Days (CDDs) (Shimpi and Turner [2001], pp. 206-207). Both HDDs and CDDs measure the variation between the average daily temperature for a stipulated geographic location (for example, a particular city) and the standard reference temperature of 18°C (or 65°F). The HDD for a day is equal to the greater of (a) 18°C minus the average temperature and (b) zero. The CDD for a day is equal to the greater of (a) the average temperature minus 18°C and (b) zero. The HDD provides a measure of the relative coolness of the daily average temperature, while the CDD is a measure of the relative warmth of the daily average temperature. Accordingly, a HDD will occur when the daily average temperature falls below the standard reference temperature while a CDD will occur when the daily average temperature rises above the standard reference temperature. A day with an average temperature of 25°C has 7 CDD and 0 HDD, and a day with an average temperature of 10°C has 0 CDD and 8 HDD.

In a temperature swap, the payment obligations of the contracting parties to each other are contingent upon, and calculated by reference to, the total number of HDDs or CDDs during a defined period (namely, the cumulative variation of the actual temperature during that period

relative to the standard reference temperature). In a HDD swap, for instance, if, at the end of one of these periods, the cumulative number of HDDs for that period (called the "Settlement Level") is greater than a specified threshold number of HDDs (called the "Weather Index Level"), then the "Weather Index Seller" under the swap will be obligated to pay the "Weather Index Buyer" an amount equal to the excess of the Settlement Level over the Weather Index Level multiplied by the notional value of the HDD swap. (The relevant terms are taken from the ISDA standard form confirmation for HDD and CDD swaps.) If, on the other hand, the cumulative number of HDDs for the period is less than the Weather Index Level, then the Weather Index Buyer will pay the Weather Index Seller an amount equal to the excess of the Weather Index Level over the Settlement Level multiplied by the notional value of the swap. In the case of a HDD swap, the Weather Index Buyer anticipates a greater number of HDDs and thus cooler than usual weather during the term of the swap, while the Weather Index Seller anticipates a lower number of HDDs and thus warmer weather during the term of the swap.

The key characteristic of the payment obligations under a temperature swap (or, indeed, any other type of weather derivative) is that the obligation of a contracting party to make payment is dependent upon whether the relevant climatic condition (namely, temperature) exceeds or falls short of a specified threshold.² Further, the amount to be paid is determined by reference to the extent by which the climatic condition exceeds or falls short of the threshold, not by reference to any decline in revenue or other loss incurred by one of the contracting parties due to the particular climatic condition.

INSURANCE LAW ANALYSIS

The issue of what constitutes an insurance product is dealt with broadly in the same manner in those jurisdictions based on English law or "common law" (including the State of New York, England, and Australia). In order for a contract to be characterized as an insurance contract in those jurisdictions, that contract must possess two essential attributes (Legh-Jones et al. [1997], paras. [1-1] to [1-6]; Merkin [1997], paras. [1-03] to [1-07]).³

First, the contract must involve one party, in exchange for the payment to it of premiums or some other valuable consideration by its counterparty, agreeing to pay a sum of money or an equivalent financial benefit to the counterparty, on the occurrence of a stipulated

contingency, and there must be some uncertainty as to if or when that contingency will occur. Secondly, the payment must be by way of compensation for the loss or damage to something in which the latter party has an insurable interest.

Weather derivatives (and, indeed, all derivatives) clearly possess the first of these attributes. On the occurrence of the stipulated climatic condition, one party will, in exchange for consideration having been provided to it by its counterparty, be obligated to make a payment to its counterparty. However, the requirement for a payment to be made on the occurrence of an event that is uncertain in nature will not, of itself, be sufficient to render the contract in question an insurance product. In England, as in New York, the party to whom payment is made must also have an insurable interest in the subject matter of the contract. It is the presence of an insurable interest that differentiates insurance products from gaming and wagering contracts which are generally illegal and unenforceable under common law. The risk of weather derivatives (and other derivatives) being characterized as wagering or gaming contracts and thus being rendered legally unenforceable is mitigated by the statutory safe-harbors for derivatives from the anti-gaming laws and the fact that, under common law, contracts entered into for a commercial purpose are not wagering or gaming contracts even if they otherwise possess the attributes of wagering and gaming contracts.⁴

The requirement for an insurable interest means that the payee under the contract must have an interest in the contract beyond the amount that may, or may not, be paid to it. If the payee has no interest other than the amount to be paid on the occurrence of the stipulated contingency, then the payee's only risk is the risk created by the contract, that is, that the contingency will not occur. An insurable interest is, in contrast, a risk that presently exists in the subject matter of the contract, not a risk that has been created by the contract itself (Lowry and Rawlings [1999], pp. 11-12). Accordingly, beyond the risk of non-payment under the contract, due to the stipulated contingency never eventuating, the payee must be subject to the corresponding risk that the occurrence of the contingency will result in loss or damage to some stipulated subject matter of the contract. Hence, the payment to be made under the contract on that contingency occurring must be designed to protect the payee from loss or damage to the subject matter of the contract.

It is, however, in respect of what legally constitutes an insurable interest that the various common law jurisdictions differ. Under New York law, the party to

whom payment is to be made under an insurance contract will have an insurable interest in the subject matter of the contract if it has a pecuniary interest in that subject matter.⁵ Australian law adopts an equivalent approach; the legal requirement for an insurable interest has been replaced with a legal requirement for a pecuniary interest.⁶ In England, in contrast, a pecuniary interest in the subject matter is a necessary, but not sufficient, indicator of an insurable interest in that subject matter.

The party to whom payment is made under the contract will have the requisite pecuniary interest in the subject matter of the contract (for the purposes of New York, English, and Australian law) if, on the occurrence of the stipulated contingency, that party suffers loss as a result of damage to, or a diminution in the value of, that subject matter. The payment under the contract must be dependent upon the payee suffering an actual loss, and the payment must therefore be designed to indemnify or compensate that party for the loss sustained in respect of its interest.⁷ The contract in question must thus be one of indemnity (Legh-Jones et al. [1997], paras. [1-10] and [1-12]; Merkin [1997], paras. [1-10] to [1-14]).⁸

Accordingly, in order for a weather derivative to be characterized as an insurance product, the weather derivative must be capable of being characterized as a contract of indemnity, where the payment received under the weather derivative is designed to make the payee whole in respect of the actual loss incurred by it through the loss or damage to the subject matter of the contract due to the occurrence of the stipulated contingency. That is not, however, the case with weather derivatives. In the case of the temperature swap examined above, the payment to be made under the swap is calculated by reference to difference between an actual climatic condition and a benchmark level, without reference to the loss of or damage to any subject matter or, indeed, any requirement for the payee to suffer an actual loss.

In addition to the payee's pecuniary interest in the subject matter of the contract, it is considered under English law that the payee must have some form of property interest in that subject matter, for the contract to be characterized as an insurance product (Legh-Jones et al. [1997], para. [1-116]; Merkin [1997], para. [3-13]). In other words, the payment made under the contract must be by way of compensation for the loss or damage to something of which the payee is the legal owner or in which the payee has some lesser property interest (such as the equitable interest of the beneficiary of a trust, or that of a mortgagee or chargee). That is clearly not the

case with weather derivatives, where the fact that the payee owns or has some other property interest in something susceptible to loss or damage on the occurrence of the stipulated climatic condition is irrelevant to its counterparty's obligation to make a payment under the weather derivative. A more liberal approach to the prerequisite of an insurable interest for insurance products is evident in more recent decisions of the English courts.⁹ In a number of decisions, the English courts have adopted the position that the requirement for an insurable interest will be satisfied, where the payee under the contract does not have ownership or some other property interest in the subject matter of the contract, provided that the payee has a proximate physical relationship (such as control or possession) to the subject matter (Lowry and Rawlings [1999], pp. 54-56). Again, this interpretation of an insurable interest should not affect the characterization of weather derivatives. The obligation to make payment under a weather derivative does not depend upon the payee either suffering a loss or damage to certain subject matter or being in some proximate physical relationship to that subject matter. In fact, the existence or non-existence of the subject matter is irrelevant to the payment obligations under a weather derivative.

CONCLUSION

Weather derivatives are superficially similar to insurance products, in that both involve the payment of amounts that are contingent upon, and calculated by reference to, an event whose occurrence is uncertain. That alone, however, is not sufficient to render a weather derivative an insurance product. Despite the disparate treatment of insurable interests in the jurisdictions mentioned above, a weather derivative, if it is to be characterized as an insurance product, must, at the very least, involve the payment obligation under the derivative being conditional upon the payee suffering an actual loss and the payment must be by way of compensation for that loss.

If there is no link between the right of a party to receive payment under the weather derivative and that party's exposure to loss on the occurrence of the stipulated climatic condition, it is highly doubtful—as the law now stands—that a court in New York, England, or Australia would characterize that weather derivative as an insurance product. This is the position that has been taken by the one major insurance regulator (the New York Insurance Department¹⁰), to date, to opine on the legal characterization of weather derivatives and is also consis-

tent with the legal consensus on the inapplicability of insurance laws to an analogous financial instrument, the credit derivative (Ali [2000b], pp. 88-92; Firth [2003], paras. [16-023] to [16-034]).

ENDNOTES

¹The relevant statutory provisions under New York, English, and Australian law are Chapter 28, Article 1, section 109, New York State Consolidated Laws; section 23(1), Financial Services and Markets Act 2000 (United Kingdom); and sections 10(1) and 11, Insurance Act 1973 (Commonwealth of Australia) respectively.

²Refer to the Bond Market Association's letter to the NAIC dated March 2, 2004, commenting on the NAIC draft White Paper. This letter is available from <www.bondmarkets.com>.

³The basis for this requirement under Anglo-Australian law is the leading case of *Prudential Insurance Company v Commissioners of Inland Revenue* [1904] 2 KB 658. The position under New York law is well summarized in ISDA's letter to the NAIC dated February 23, 2004, commenting on the NAIC draft White Paper. This letter is available from <www.isda.org>.

⁴The statutory safe-harbors under U.S. federal law and English and Australian law are section 12(e)(2), Commodity Exchange Act (inserted by Commodity Futures Modernization Act of 2000), section 412(1), Financial Services and Markets Act 2000 (United Kingdom); and section 1101I, Corporations Act 2001 (Commonwealth of Australia) respectively.

⁵Chapter 28, Article 34, section 3401, New York State Consolidated Laws.

⁶Sections 16(1) and 17, Insurance Contracts Act 1984 (Commonwealth of Australia).

⁷As to the requirement under Anglo-Australian law for an actual loss to be suffered, refer to *Yorkshire Wagon Railway Company v Maclure* (1881) 21 Ch D 309.

⁸For the requirement for a contract of general insurance to be a contract of indemnity under Anglo-Australian law, refer to *Wilson v Jones* (1867) LR 2 Ex 139 and *Re London County Commercial Reinsurance Office* [1922] 2 Ch 67.

⁹For example, *Petrofina (UK) Ltd v Magnaload Ltd* [1983] 2 Lloyd's Rep 91.

¹⁰Refer to the New York Insurance Department's legal opinion entitled "Weather Financial Instruments (derivatives, hedges, etc.);" dated February 15, 2000. This legal opinion is available from <www.ins.state.ny.us>.

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