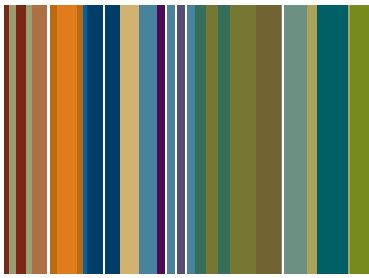
SUNGARD KIODEX



A CASE FOR TRANSPARENT VALUATIONS OF OTC COMMODITY CONTRACTS IN TUMULTUOUS TIMES

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INTRODUCTION

In August 2007, BNP Paribas told investors that they would not be able to take money out of two of its funds. This was because BNP could no longer value the assets in them, due to a 'complete evaporation of liquidity' in the market. The problem was investment in over the counter (OTC) derivatives, which required liquid markets to value them. When liquidity dried up, the ability to value the OTC contracts was significantly impaired. This problem is most pronounced in the credit default swap (CDS) market which has a notional trade value of around $58 trillion. However, the problem also applies to the rapidly growing commodity OTC derivatives market, whose notional value has increased by 500% to $9 trillion over the5- year period from 2002 to 2007, and by 27% in 2007 alone. This paper will identify the issues involved in valuing OTC commodity derivatives and provide ways to solve the valuation problems.

THE PROBLEM: LACK OF DATA, TRANSPARENCY

The popularity of OTC derivative contracts as a method to hedge commodities risk has grown significantly over the last few years. There are three reasons why OTC derivatives exist. First, they give companies hedging risk for acquiring customized contracts matching their unique risk profiles. Second, they allow them to hedge without posting daily margins in exchange. Third, they allow companies to trade in contracts that either do not exist in exchanges or do not have enough liquidity on exchanges.

Commodities are not alone in this respect; the interest rate, foreign exchange (FX) and credit default swap markets have experienced similar growth patterns. However, where the commodities market differs from the others is in the greater challenge of valuing OTC contracts. Unlike the FX and interest rate markets where there is plenty of market price data available on the underlying assets, there is much less data available for commodities. As a result, the commodities market is more opaque than the others. In addition, commodity markets are more complex. Unlike, FX and interest rates, commodity markets vary by several factors like grade, location, etc.

All of these benefits lead to lack of transparency in commodities markets. If both parties have equal information related to valuing a deal, then transparency is not an issue. But if information is asymmetrical and the bank has materially greater information than the company, then the company is at a disadvantage.

How can the company be sure that it is getting a fair deal, if the bank is in a position to use its own information to price the deal? Opacity and information irregularity have been problems in other exotic markets such as collateralized debt obligations (CDO) and CDS, causing major concerns for auditors and other stake holders. This concern is spreading to the commodities market. Determined that participants avoid the fate of BNP Paribas, auditors, investors/analysts, and regulators are increasing their scrutiny of OTC trades.

THE REAL COST OF THE PROBLEM

Lack of data and transparency can cause a number of material costs in terms of compliance issues as well as higher collateral, capital and opportunity costs.

To comply with FAS 133/IAS 39 or FAS 157, companies need to prove to their auditors that their hedge trades are effective. To achieve this, they need proper data and valuations. The auditor may ask the company to verify the value of their hedge trades. If the company is relying on the bank's trade values and the derivation of those values cannot be validated, then the auditor will have a difficult time validating the company's hedge accounting FAS 157 compliance.

In addition, the bank may ask for collateral from the company when executing the OTC contract. This collateral is based on the bank's valuations, which are not derived from a validated, independent source. Incorrect valuations can cause corporations to post more collateral than required, which can increase collateral cost with the bank. Typically, collateral takes the form of cash, cash equivalents or contingent liability such as guarantees. Therefore, the company needs to find the capital to post this collateral. That poses an opportunity cost. In today's markets, the cost of capital has risen significantly, therefore any funds or contingency takes funds away from active projects. The opportunity costs represents the foregone earnings on such lucrative projects.

SOURCES OF THE PROBLEM: DATA OPACITY AND INCORRECT VALUATIONS

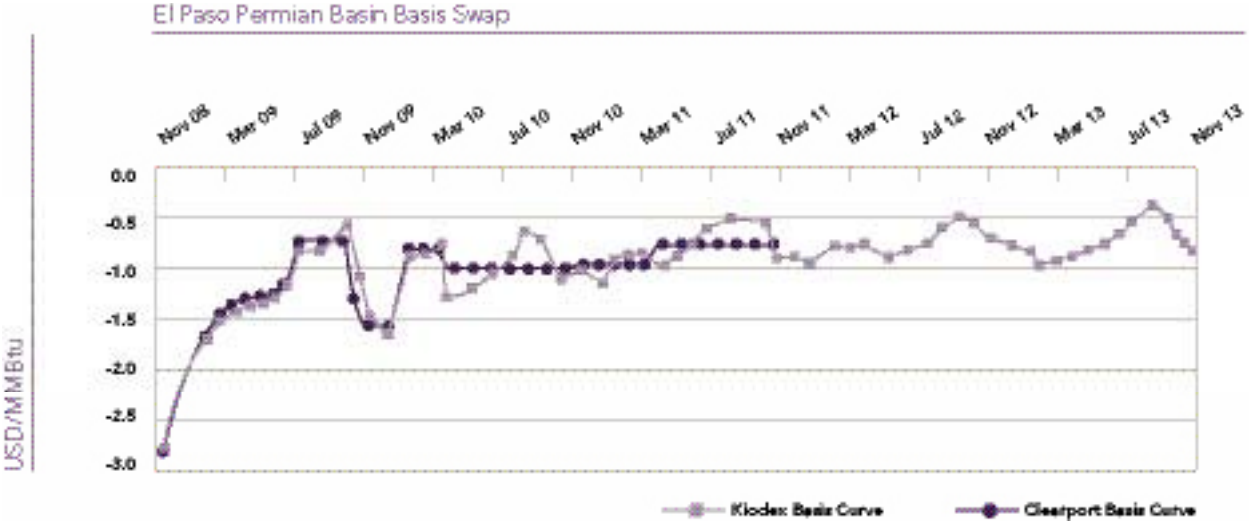
The key sources of the problem are market data opacity that causes information irregularities, and inappropriate models that lead to incorrect valuations.

1) Lack of Independent Data

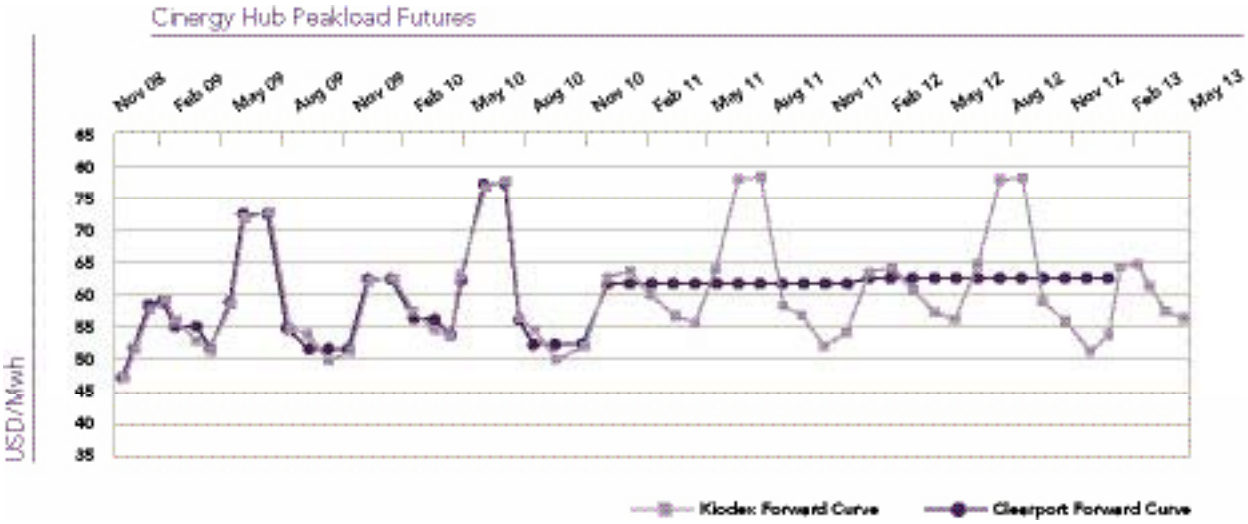
Since commodity markets are traded through a network of brokers rather than on exchanges, the forward curves and volatility surfaces are not transparent. The solution to the problem is an aggregated source of this data. The data must be based on real market transactions or quotes, not on surveys, to ensure that the prices obtained are relevant to current market conditions. Surveys often do not bear any relation to the prevailing market conditions because they are based on the opinions of trader, not executable bids and offers.

In addition, broker markets execute trades on a quarterly, seasonal or calendar basis, which may not be the timeframe the company needs. As a result, the optimal source of data is one in which the data has gone through a rigorous process of creating seasonality or "shaping." Reliable data uses multiple sources for comparison, rather than relying on a single broker or bank.

Public sources of available data, Clearport, generate two main problems. First, the data stops beyond a certain maturity date, as illustrated by the following chart comparing Clearport data for a North American Natural Gas contract, versus SunGard's Kiodex independent data for the same contract:



Second, Clearport data often does not capture the seasonality exhibited in commodity markets, and therefore represents the forward curve as a flat line. This is illustrated below, again comparing Clearport data to SunGard's Kiodex for North American Power location. Without long term data, long dated trades can not be valued; and wthout seasonality, trades are valued inaccurately.



2) Inappropriate Commodity Models

Attempting to value commodity trades with other models will result in incorrect valuations. For example, a commodity consumer may try to value a commodity Asian option using an interest rate or FX model. The method to convert European volatilities to Asian volatility presupposes a certain peculiar behaviour of the commodity markets, such as relative mean reversion (*see additional information in the white paper, "Is Mean Reversion Dead?" by Dr. Rick Boesch at* ***www.sungard.com/kiodex***). Interest rate and FX markets exhibit different characteristics that cause the conversion to be incorrect, as this method assumes that commodity prices behave like interest rate or FX prices.

An illustration of this is presented below. Take an Asian option in ICE Brent for Calendar 2009 with a strike price of $80 a barrel. To price this option, one must take into account that option payoff is based on average of daily prices instead of pricing on the last contract day. To value an Asian option, implied volatilities that are traded in a European Option (which settles on the last contract day, as opposed to average of daily business days) need to be converted.

One must model commodity characteristics such as 'relative mean reversion' to convert such volatilities. The illustration below shows how those volatilities are converted using SunGard's Kiodex Multifactor Model. When one uses simplistic models that have been carved out of interest rate and FX systems, the conversion is based on simplistic averaging and scaling of volatilities by time. This process is not only cumbersome, but also deficient.

The difference in valuation—and the resulting impact—could be significant. For example, the previously illustrated $80 Calendar 09 ICE BRENT call option priced on October 15, 2008 based on proper multifactor model would value for $11.61 per barrel; whereas a similar option valued using one of the simplistic scaling technique, would value for $11.39 per barrel. That is a spread of 1.89%, which is significant enough to impact a company's financial ratios depending on the size of the transaction.

Volatility of an Asian Option

Volatility Info			
Volatility	Start Date	End Date	Option Expiry
51.71	02/01/09	30/01/09	30/01/09
50.30	02/02/09	27/02/09	27/02/09
48.11	02/03/09	31/03/09	31/03/09
46.90	01/04/09	30/04/09	30/04/09
45.65	01/05/09	29/05/09	29/05/09
44.22	01/06/09	30/06/09	30/06/09
43.11	01/07/09	31/07/09	31/07/09
41.78	03/08/09	31/08/09	31/08/09
40.58	01/09/09	30/09/09	30/09/09
39.66	01/10/09	30/10/09	30/10/09
38.84	02/11/09	30/11/09	30/11/09
37.96	01/12/09	31/12/09	31/12/09

Volatility of a European Option

Volatility Info			
Volatility	Start Date	End Date	Option Expiry
59.13	16/12/08	16/12/08	16/12/08
54.69	15/01/09	15/01/09	15/01/09
52.38	12/02/09	12/02/09	12/02/09
49.28	16/03/09	16/03/09	16/03/09
48.37	15/04/09	15/04/09	15/04/09
45.81	14/05/09	14/05/09	14/05/09
45.02	15/06/09	15/06/09	15/06/09
42.99	16/07/09	16/07/09	16/07/09
41.99	14/08/09	14/08/09	14/08/09
40.31	15/09/09	15/09/09	15/09/09
39.77	15/10/09	15/10/09	15/10/09
38.61	13/11/09	13/11/09	13/11/09

THE SOLUTION

It is clear that the problem is one of information asymmetry leading to lack of trust, whether from auditors or stakeholders. The problem can therefore be solved through increasing the information available to global corporations to help them value their trades.

Market data transparency and improved modelling will come about when three main factors are present: validation, seasonality, and quality. Global corporations can solve the problem by assimilating transactional data through multiple broker sources, applying seasonality shaping, and creating a rigorous quality control process to eliminate outliers. In addition, they would need to create commodity-specific models that take into account relevant matter of commodity valuations like 'relative mean reversion.'

Another way global corporations could tackle the problem would be to tap into an independent third party provider to value their trades and to help provide an impartial view on the value of their portfolios. This is much more acceptable to auditors than simply relying on values from counterparties, with little or no means of verifying them.

While there are undoubted benefits to investors and corporations trading in OTC commodity derivatives, there are exposures to an opaque, illiquid market. The problem has been made much worse since the start of the credit crunch in August 2007, as credit and liquidity have dried up, and much less information is available to price OTC trades. As a result, corporations have difficulty explaining to their auditors the valuations they are using, and cannot be certain of accuracy in posting collateral for their trades. The solution is to empower corporations with the ability to obtain their own trade values from an independent third party that uses objective market data and commodity-specific models.

Sources:

http://www.bis.org/statistics/derstats.htm

About the Authors

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About SunGard's Kiodex

A Web-based trading and risk management solution for commodities traders, delivered on a Software-as-a-Service basis, Kiodex integrates deal capture and risk management capabilities with valuation models and independent market data. Traders, hedge funds and corporations with exposure to commodity prices use Kiodex to help measure risk, design optimal hedging strategies, improve price execution, and comply with accounting best practices. Visit SunGard's Kiodex at www.sungard.com/kiodex.

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