



ARTICLE

Derivatives close-outs

COVID-19 – Challenges to the valuation of derivatives upon early termination

June 2020

The first half of 2020 has witnessed the detrimental impact of the COVID-19 pandemic on the global economy. Financial markets declined at rates reminiscent of the 1987 and 2008 financial crises. The path back to normalcy remains uncertain given the health crisis that continues to devastate communities worldwide.

The COVID-19 outbreak has led to an unprecedented slowdown in the global economy as entire economies are shut down due to governments' confinement measures. Most governments have responded to this crisis with monetary policies, fiscal stimulus packages and regulatory relief in reaction to the market stress. Some markets have closed, triggered circuit breakers, imposed temporary trading suspensions and temporary bans on short selling. Despite these various measures, the economic consequences of the pandemic have impacted virtually all asset classes and, de facto, also impacted derivatives.

This paper seeks to highlight the various valuation challenges that users of derivatives might face as a result of COVID-19. More specifically, this article discusses the operational and valuation challenges upon early termination of OTC derivative contracts under ISDA.

Introduction to derivatives

Derivative instruments are financial agreements that derive their value from the value of an underlying reference variable. This could be the price of hard or soft commodities, a stock or basket of stocks, stock indices, a currency or basket of currencies, a bond or credit spread, an inflation or interest index, the price of real estate, the weather, etc.

Derivatives can be used to hedge or transform and therefore transfer risk (i.e. the uncertainty associated with a variable). As some markets offer a finite number of assets available to trade (e.g. the stock or bond markets, commodities) derivatives can be a convenient substitute where investments cannot be acquired directly. Some investors therefore use derivatives as substitutes to invest or speculate.

Unsurprisingly, interest rates derivatives are by far the largest derivatives market given the amount of lending and borrowing necessary to finance the economy.

FIGURE 1: OTC DERIVATIVE CONTRACTS BY PRODUCT TYPE (2000 – 2019)



Source: BIS

As the value of a derivative is linked to the change in the level of an underlying variable, derivatives come at a comparatively lower upfront cost relative to acquiring the asset itself; typically a fraction of the asset’s value. Such cost comes in the form of a premium and/or an initial margin requirement. Derivatives are therefore subject to leverage risk, namely the risk that the return on the derivative will be a multiple of the initial amount invested. If misused, derivatives can therefore expose users to significant losses.

Once matured, derivatives can be settled physically (i.e. by delivering the underlying at a price and maturity agreed at the outset) or cash settled (i.e. by delivering cash).

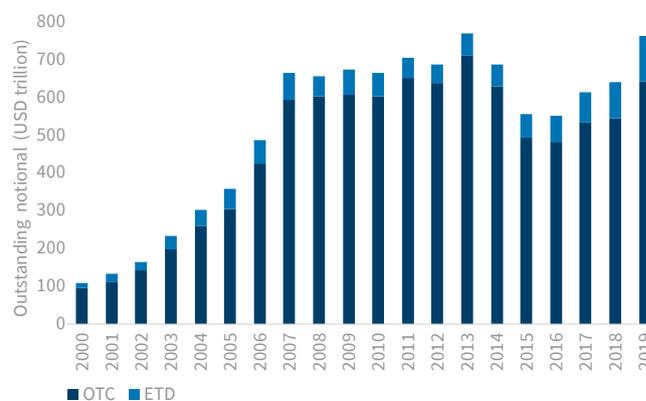
Derivatives can be traded on exchanges, referred to as exchange traded derivatives (“**ETD**”) and bilaterally through brokers or alternative trading venues, referred to as over the counter (“**OTC**”) derivatives. More standard derivative products are typically ETD and more bespoke contracts are traded OTC.

ETDs are settled via a central counterparty clearing house. They are therefore not subject to counterparty risk and are exposed to the default risk of the clearing house instead. ETDs are standardised in terms of legal documentation, maturity, payoff, size, minimum incremental price movement underlying, margining, settlement and other economic and operational terms.

OTC derivatives are bilateral agreements subject to counterparty risk. Following the global financial crisis of 2008 regulators have imposed a phased transition for most OTC derivatives to be cleared via central counterparties.

Whilst most OTC derivatives are executed via standardised legal frameworks, such as the International Swaps and Derivatives Association (“**ISDA**”) Master Agreements (“**MA**”), the parties preserve a level of flexibility with regards to optional legal, operational and economic terms of the derivatives they enter. OTC derivatives are therefore bespoke in many respects. Given that investors’ circumstances and preferences are all different, OTC derivatives unsurprisingly form the vast majority of the derivatives traded globally, representing over six times the notional outstanding of ETDs as shown in Figure 2.

FIGURE 2: OTC DERIVATIVES VERSUS ETD MARKET (2000 – 2019)



Source: BIS

Although derivatives instruments are usually classified in the broad categories of forwards, swaps and options contracts, these can vary in economic payoff profile, complexity and liquidity. Some derivatives come with vanilla payoffs (for example, European options or vanilla interest rate swaps) and others with exotic payoffs (for example, American barrier options). In addition, some derivatives have payoffs contingent to an event as opposed to a change in value. For example, the payoff of credit default swaps is linked to the occurrence of an event of default from a debt issuer.

Market update

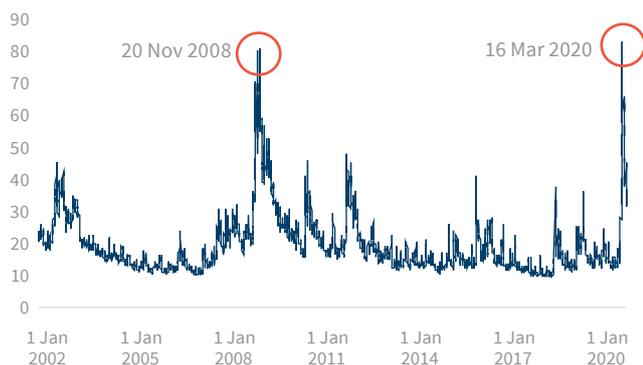
As a result of the COVID-19 pandemic and economic slowdown, we observe general and unprecedented correlation across asset classes globally.

Stock markets – The slowdown in the global economy is marked by stock indices being dragged down as the virus spreads and economies shut down. Major stock indices have exhibited large and unprecedented drawdowns. For example, the most prominent French stock market index, CAC 40, lost 40% from February to March 2020.

The average correlation of major stock indices against the S&P 500 is higher than the average correlation observed during the Global Financial Crisis, and higher than the correlation observed on 24 August 2015 at the tipping point of the 2015 stock market selloff. The S&P 500 VIX index, an estimate of volatility implied from S&P 500 options prices, which is seen as an indicator of future uncertainty, reached its highest point in history on 17 March 2020, over 83%. This is uncharted territory. Previously the highest VIX value was just over 80% in November 2008, the midst of the Global Financial Crisis.

One of the unusual characteristics of the economic crisis associated with COVID-19 is the speed and magnitude at which it has spread across economies globally. The VIX jumped by a factor of 5.83, compared to a factor of 4 during the Global Financial Crisis.

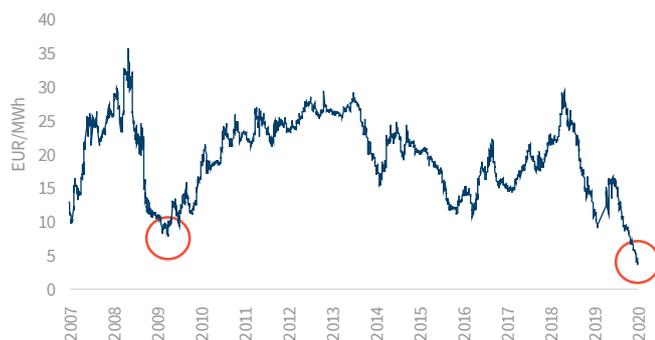
FIGURE 3: VIX HISTORICAL LEVEL (1992-2020)



Source: S&P Capital IQ

Commodities and Energy – Natural gas prices in the US have been low for a long time due to shale gas discoveries. Similarly, Europe and Asia have experienced low spot gas price levels prior to the COVID-19 outbreak due to oversupply. A reduction in demand, including in China, has led to even lower prices, e.g. front month TTF prices reaching a low not seen since 2009.

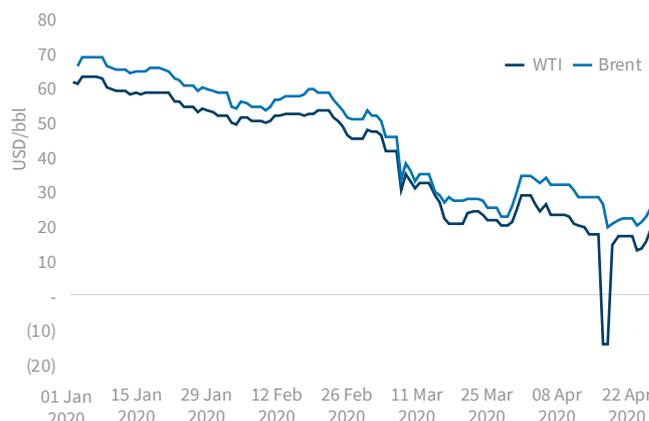
FIGURE 4: TTF FRONT-MONTH FUTURE PRICE (2007-2020)



Source: Marex Spectron

Due to the large drop in demand for and consumption of oil, the COVID-19 pandemic engendered an oil crisis, with WTI oil prices reaching negative territory on 21 April 2020, when producers were forced to pay buyers to take and store oil and prevent shutdowns.

FIGURE 5: WTI AND BRENT FRONT-MONTH FUTURES PRICES



Sources: ICE and CME

Fixed income and credit – With the worldwide economy shutting down, the risk of bankruptcy for companies has increased tremendously, with some sectors (e.g. leisure, automotive, oil and gas, air transport, retail and discretionary spending) more exposed than others (e.g. healthcare, telecommunication or media). The MSCI 30-day rolling average of the correlation between sectors’ implied default rates shows that the correlation rose from below 30% to above 80% within weeks. Distressed credits reached record highs at record speed according to S&P: as an example, the oil and gas sector has hit a distressed ratio as high as 94%.

Five years CDS indices like the iTraxx Europe, iTraxx Asia (ex-Japan) or CDX for North America have seen their spread jump by about 100 bps between 21 February 2020 and 18 March 2020. This is equivalent to a five-year probability of default (“PD”) tripling from about 4% to about 12%. CDS spreads for high-yield debt such as 5-year iTraxx Crossover or CDX High Yields indices increased by about 400 and 480bps respectively between 21 February 2020 and 18 March 2020. Assuming a recovery of 40% upon default, this is equivalent to PDs moving from about 20% to over 45% for those indices. Emerging markets debt (the CDX EM index is composed of 18 sovereign reference entities, 13 of which are investment grade) has followed a similar pattern, with spreads increasing by about 250bps, equivalent to PDs increasing from about 15% to 32%.

Leveraged loan prices have sharply declined in response to a sell-off affecting CLOs and lower levels of new issuances.

CLO equity net asset values have dropped significantly, and spreads widened across tranches surpassing peak levels reached during the Global Financial Crisis. US leveraged loans trading in secondary markets plunged about 13% during Q1, the biggest slump since 2008.

Sovereign debt – According to Moody’s, the freezing of the global economy will affect GDPs across the globe. The GDP of the G-20 advanced countries is expected to shrink by 2% in 2020 (compared to a GDP growth of 1.7% in 2019) and grow by 1.9% in G-20 emerging countries (compared to a growth of 4.2% in 2019). Sovereign debt risk premia have followed a similar pattern as corporate debt, with Latin America and Europe (specifically Greece, Portugal, Italy and Spain) being the most impacted. Governments will need to fund their economy and, with negative or low GDPs expected for 2020, their cost of funding is likely to rise.

Rates – Central banks have been deploying stimulus packages to support banks and economies for some time. Several drastic rate cuts meant to spur the economy by encouraging spending and investment, have already happened. 85 rate cuts have occurred in Q1 2020 around the globe, of which 62 occurred in March 2020; some notable ones are summarised below. Negative interest rates in major economies are also being contemplated.

TABLE 1: NOTABLE RATE CUTS IN MARCH 2020

Date	Geography	Rate affected	Level in % (cut in bps)
19 Mar	United Kingdom	Bank Rate	to 0.10 % (- 15)
16 Mar	Hong Kong	Base Rate	to 0.86 % (- 64)
15 Mar	USA	Funds Rate	to 0.00 - 0.25 % (- 100)
13 Mar	Canada	Target ON Rate	to 0.75 % (- 50)
11 Mar	United Kingdom	Bank Rate	to 0.25 % (- 50)
04 Mar	Canada	Target ON Rate	to 1.25 % (- 50)
03 Mar	Hong Kong	Base Rate	to 1.50 % (- 50)
03 Mar	USA	Funds Rate	to 1.00 - 1.25 % (- 50)

Source: Bloomberg

Currencies – US dollar confirmed its status as reserve currency with most currencies depreciating against it when market crashes in other asset classes occurred. Gold’s status as a safe haven was put into question for a short period of time (losing about 16% of its value between 8 and 15 March 2020) when liquidity was required but has since recovered.

Derivatives Close-outs under ISDA agreements

The increased correlation and volatility observed across markets and the increase in credit spreads (and therefore counterparty risk) combined with the mandatory restrictions on people’s movements and social distancing, may affect the timing of margin calls and likelihood of counterparties defaulting on their obligations under derivatives agreements.

In the context of COVID-19, market participants might rely on certain clauses as a legal basis to excuse non-performance or as a right to terminate contracts. Where the legal basis for termination and/or the value upon termination are disputed, an independent valuation of derivatives instruments may be required in order to (i) assess losses in actual and counterfactual scenarios and (ii) form a view on potential damages.

Here we focus on the challenges that could be faced when terminating derivatives under the MAs. There are however other standardised documents for derivatives, such as the European Federation of Energy Traders Gas and Electricity Master Agreements, which provide a similar structure to the MAs.

There are a number of different versions of the MAs, including the 1992 and 2002 versions. The purpose of the MAs is to set out provisions governing the parties’ overall relationship. These provisions can be broken down into themes including (i) certain events that can happen outside of the contract that may affect the parties ability to perform their obligation; (ii) provisions that may affect or modify the quantum and timing and the manner in which payments and deliveries are made; (iii) close-out and netting provisions;¹ and (iv) how the parties should resolve disputes that may arise.

Event of Default and notifying defaulting parties

Given the rapid and systemic deterioration across markets, it is possible that numerous parties failed to fulfil their obligations and triggered an Event of Default. Events of default include for example: failure to pay or deliver, breach or repudiation of agreement, credit support default, misrepresentation, cross-default, bankruptcy, merger without assumption, default under specified transaction.

¹ The MAs contain provisions to ensure that each party’s financial exposure across all transactions is capable of being determined on a net basis.

Failure to settle a scheduled payment, respond to a margin call, or deliver collateral for example could trigger an Event of Default. In such circumstances Early Termination is triggered and all transactions under the MA closed-out.

As observed during the 2008 Global Financial Crisis, and as reminded by numerous prominent law firms in the context of COVID-19, the basis for triggering the Early Termination, the validity of the notification under the relevant MA and election of an Early Termination Date by the non-defaulting party may be legally challenged.

As a result of COVID-19, market closures, unscheduled Holidays (such as China's extended Lunar New Year Holiday), quarantines and restrictions on people's mobility and mandatory confinement could be a vector to such challenges and may affect notifications, deliveries and payments under the MAs. The COVID-19 circumstances could prevent employees from performing their day job, attending their office to send/receive instructions or notifications, to process or receive payments and/or receive or deliver collateral, execute orders etc.

In such cases, the close-out of derivatives may be legally challenged by the Defaulting Party, and a valuation and/or settlement dispute may arise. The 1992 and 2002 MAs use different approaches to determine close out valuations.

Close-out approach under the 1992 MA

Under the 1992 MA, parties generally select one of two payment measures to determine early termination payments: 'Loss' and 'Market Quotation'.

MARKET QUOTATION

The Market Quotation method requires computing a trimmed average (excluding the highest and lowest) of at least three quotations from Reference Market-Makers of an economically equivalent replacement transaction. Reference Market-Makers are defined as four leading dealers in the relevant market selected from dealers with the highest credit standing and having an office in the same city. The definition of Reference Market-Maker itself makes it hard for the determining party to comply, particularly in a fast-moving market at times of high volatility, and low liquidity.

In such disrupted markets, available dealers satisfying the criteria of a Reference Market-Maker may be reluctant to give quotations that could rapidly be off-market and could not be hedged efficiently and honoured without incurring a loss. As a result, when quotations are received, quotations may vary significantly from one dealer to another and may not reflect the price at which dealers will effectively trade.

Temporary market closures², short-selling bans, trading suspensions and circuit breakers, would alter dealers' ability to provide timely quotations. In such situations, depending on the timing of the request for quotation and time for response of each dealer, the average may not be reflective of the cost at which a replacement transaction could be executed at a given point in time.

The limitations of the Market Quotation at times of market stress are especially true for complex and illiquid derivative instruments, where quotations depend upon sophisticated modelling and data assumptions and therefore require dealers' time to read the documentation properly and understand the economic terms in order to be modelled and quoted. If the dealers do not have appetite for such risk, they may not provide a quotation at all. This limitation is even more pronounced in cases where the derivative instruments refer to multiple markets or asset classes traded in different jurisdictions.³

LOSS

In the event that the Market Quotation cannot be determined, or if the non-defaulting party considers that the Market Quotation does not produce a commercially reasonable result (which, as observed during the aftermath of the 2008 Lehman Bankruptcy, could be legally challenging), the non-defaulting party could rely on the Loss approach.

The Loss calculation requires a party to determine in good faith its losses (or gains) incurred from terminating, liquidating, obtaining or re-establishing any hedge or related trading position. The MAs simply specify that the non-defaulting party may (but need not) rely on quotations of relevant rates or prices from one or more dealers in the relevant markets. This may therefore include Market Quotations.

Under Loss, in absence of quotations and where transactions are hard to value, then the non-defaulting party may have no choice but to (i) undertake the exercise that a Reference Market-Maker would undertake in order to produce a quotation and produce a valuation of its own or (ii) wait until it can proceed with the Market Quotation approach. In order to achieve a commercially reasonable result the former would involve relying on reasonable data and modelling methods, but not all derivatives users

² Complete market closure has already been observed in the Philippines, where all stock, bond and currency trading was suspended.

³ In the event of market closure, the impact on asset classes is not expected to be equal.

have the personnel and systems to do so and obtain a commercially reasonable result.

Given the challenges a determining party could face at times of market stress, close-outs under the 1992 MA have been subject to numerous litigations and judgements.^{4,5,6,7}

Close-out approach under the 2002 MA

In the 2002 MA, Market Quotation and Loss were replaced by the notion of Close-out Amount, which is defined as:

“The amount of the losses or costs of the Determining Party that are or would be incurred under then prevailing circumstances (expressed as a positive number) or gains of the Determining Party that are or would be realized under then prevailing circumstances (expressed as a negative number) in replacing, or in providing for the Determining Party the economic equivalent of, (a) the material terms of that Terminated Transaction or Group of Terminated Transactions... and (b) the option rights of the parties in respect of that Terminated Transaction or Group of Terminated Transactions”.

The Close-out Amount is to be determined by “the Determining Party, which will act in good faith and use commercially reasonable procedures in order to produce a commercially reasonable result” as of the Early Termination Date, or as soon as commercially reasonable. In determining the Close-out Amount the Determining Party may consider any relevant information.

Relevant information includes the creditworthiness of the Determining Party, the terms of any relevant documentation including credit support documentation between the Determining Party and the third party providing the quotation, market quotations, and relevant market data supplied by third parties, such as prices, yields, yield curves, volatilities, spreads, correlations or other relevant market data in the relevant market. The sources of information could be dealers in the relevant

markets, end-users of the relevant product, information vendors, brokers and other sources. Internal sources (such as affiliates of the Determining Party) can be used too if the information is obtained in the normal course of business.

The calculation of the Close-out Amount may also consider any loss associated with terminating, liquidating or re-establishing any hedge related to the transactions terminated. This can be difficult to estimate when transactions’ risks are netted and managed as part of a larger book in which hedging costs are not directly attributable to a party or single transaction.

Commercially reasonable procedures may include:

1. *Application to relevant market data of “pricing or other relevant models that are, at the time of the determination of the Close-out Amount, used by the Determining Party in the regular course of its business...”;*
2. *Application of “different valuation methods ... depending on the type, complexity, size or number of Terminated Transactions of group of Terminated Transactions”.*

Although the 2002 MA provides more flexibility and discretion to the non-defaulting party relative to the 1992 MA, Close-out Amount has been the subject of challenges at times of market stress and has resulted in disputes.^{8,9}

Valuation challenges

Here we discuss the key challenges faced by valuers when assessing the value of derivative positions.

Reviewing the documentation

Valuation errors are often rooted in a bad understanding of the terms of a transaction. Spending enough time and resources on reviewing the governing economic and legal terms of a derivative transaction is an important first step. Details on transactions confirmations or term sheets matter, particularly for exotic transactions with esoteric payoffs and economic conditions.

4 Australia and New Zealand Banking Ltd v Societe Generale, EWCA, Civ 44 (17 February 2000); Peregrine Fixed Income Ltd v Robinson Department Store Public Co Ltd, EWHC, Commercial 99 (18 May 2000);

5 The meaning of the words “quotations from Reference Market-makers” in the definition of “Market Quotation” was held in Lehman Brothers Finance SA v Sal Oppenheim JR & Cie KGAA [2014] EWHC 2627 (Comm) to be a real offer at which a dealer was willing to contract on the day of the quotation. And it was later confirmed by Mr Justice David Richard that the reference to quotations under the definition of Loss had the same meaning as under Market Quotation in the judgement between Fondazione Enasarco and Lehman Brothers Finance S.A. and Anthracite Rated Investments (Cayman) Limited [2015] EWHC 1307 (Ch) Case No: HC13B03839).

6 Lehman Brothers Finance AG (in liquidation) v Klaus Tschira Stiftung GmbH and Dr H C Tschira Beteiligungs GmbH & Co KG (2019)

7 Fondazione Enasarco v Lehman Brothers Finance S.A. and Anthracite Rated Investments (Cayman) Limited [2015] EWHC 1307 (Ch) Case No: HC13B03839

8 Lehman Brothers Special Financing Inc. v National Power Corporation and another [2018] EWHC 487.

9 Lehman Brothers International (Europe) -v- Lehman Brothers Finance S.A. [2013] EWCA 188.

Replicating the economic profile

The economics of structured derivatives can often be replicated with a combination of more standard instruments. For example, a “Call Butterfly” payoff strategy is composed of a purchase of an in-the-money call option, a sale of two at-the-money call options and a purchase of one out of the money call option. Although the Call Butterfly may not be readily available in the market at a point in time, it is likely that vanilla calls will be traded, and prices will be available. In a similar way, structured notes involve a combination of a bond floor bearing the credit risk of the note’s issuer and derivatives. Again, for major market participants it is very possible that a bond with a similar maturity and seniority as the structured note is traded in the market and could be used to benchmark the yield to maturity of the bond floor. Therefore, understanding whether a structured product can be fully decomposed into a combination of more standard products makes the modelling exercise easier provided that its value is the sum of component parts which are more likely to have a readily available market.

Market data

Investigating which market data was available at a point in time and testing whether such data is reliable for a valuation exercise is key. Where valuations are performed retrospectively it is crucial to exclude information that was made available after the valuation date or time, as this would corrupt the valuation exercise.

Market data may not always be published in the same way by trade repositories and exchanges. It is important to understand the nomenclature and classification of transactions, the units in which they are reported and their definition so that they can be included or excluded. For example, it is not unusual for exchanges to report trades later than they occurred. This can happen with block trades. Information that is backfilled needs to be excluded unless the valuing party had (private) access to the information at the relevant time.

Sometimes market data can contain errors which will need to be rectified. Errors can be identified by comparing different sources of information for example.

Prevailing market conditions

Gaining knowledge on liquidity, trading restrictions, market suspensions, measures taken by market authorities, market announcements (central bank decisions for example) and news or market updates provided to traders may provide context to a valuation, particularly where

assumptions need to be made on the market consensus or uncertainty at a particular point in time.

Choice of valuation approach

Choosing an appropriate valuation approach will be critical given the current market. The nature of the instrument, its complexity and the availability of a market influences the valuation approach. We discuss below five generic valuation approaches:

Quoted price: relying on a readily available market for an instrument. A readily available and observable market is a market in which the quantity and traded price for such instrument is available.

Mark to Market: the instrument is not standard but one can rely on a readily available and observable market for standard instruments referencing the same underlying (ideally where the quantity and traded price for such instrument is available) and there is a recognised modelling approach to calibrate the price of such instrument onto the market for more standard instruments.

Mark to Model: when there is no readily available market for instruments referencing the same underlying but there is a recognised modelling approach available, indicative prices can be obtained and/or transactional information (including price and volumes) for proxies can be identified.

Specific: when there is no readily available market for instruments referencing the same underlying, there is no recognised modelling approach available, some risk factors cannot be modelled, but indicative prices can be obtained and/or transactional information (including price and volumes) for proxies can be identified.

Theoretical: when the instrument has unique characteristics and there is no readily available market for instruments referencing the same underlying, there is no recognised modelling approach, some risk factors cannot be modelled, no indicative prices can be obtained, and no proxy can be identified.

Model validation

The valuation exercise can be very sensitive to calibration and modelling assumptions. Using closed-form mathematical solutions, where appropriate, will make the modelling exercise more stable and less computationally expensive relative to statistical approaches (such as a Monte Carlo simulations).

Where reference valuation models are implemented, such as closed-form solutions for barrier options or

implementations of stochastic volatility models, it is important to understand the limitation of such models (for example does it allow for prices or rates to go negative) and compare the results obtained with the implemented model against an independent library of models or simply against the results obtained in the paper or book discussing such model.

Where assumptions need to be made or bespoke models need to be developed, it is important to test the consistency of the model output by stressing the inputs and assumptions. This is particularly relevant for hybrid and theoretical valuation approaches as there is no benchmark model available to validate the results.

How FTI Capital Market Services EMEA can help

We cumulate decades of experience in trading, investment management, valuation, risk management and regulation covering a wide range of complex financial instruments and derivatives across asset classes. Our team is composed of industry experts, having worked for global

and leading financial institutions, and bring quantitative expertise in developing models and risk analytics in complex trading environments.

Having been involved in many precedent market turmoils FTI has a long track-record at providing independent valuation solutions in special situations such as restructurings and transactions advisory, and providing independent expert opinions and testimonies in the context of disputes, litigations, arbitrations.

It is not possible to determine at this stage how derivatives valuations will be challenged under MAs, and the combination of legal, operational and economic arguments that will be advanced in such unprecedented market circumstances. FTI will continue to monitor market developments in order to best assist its clients when the need arises.

We have developed computationally efficient valuation frameworks and stand ready to provide independent valuations in complex situations like the state of markets today.

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BRUNO CAMPANA

Senior Managing Director
+44 20 3727 1081
+44 7912 560 198
bruno.campana@fticonsulting.com

ESTHER MAYR

Senior Managing Director
+44 20 3727 1165
+44 7967 781 375
esther.mayr@fticonsulting.com

DENIS DESBIEZ

Managing Director
+44 20 3727 1387
+44 7989 233 324
denis.desbiez@fticonsulting.com



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